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ABSTRACT

The growth of indexing services has emphasized the need for more knowledge of the indexing process itself. Consistency is necessary for continuing progress in the field. This study postulates that: (1) definitions of indexer consistency should consist of the indexer's perception of indexable concepts and his choice of terminology; (2) both parts of the definition can be measured separately; (3) there will be a large difference in the degree of each; and (4) indexer consistency scores should contain both elements. For the study, five indexers read 550 journal articles and labeled the concepts discussed in each article. Findings from this exercise indicate a need for a re-examination of the problem of indexer consistency and its relation to: (1) tests of the effectiveness and efficiency of indexing languages and systems; (2) index tools and methodology; (3) index research, much of which has concentrated on terminological relationships to the neglect of concept-related problems; and (4) indexer consistency as a factor in indexer-user consistency in choice of concepts or terms for the retrieval of indexed information. (Author/SJ)

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INDEXER CONSISTENCY IN PERCEPTION OF CONCEPTS AND IN CHOICE OF TERMINOLOGY

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ABSTRACT

INDEXER CONSISTENCY IN PERCEPTION OF CONCEPTS AND IN CHOICE OF TERMINOLOGY

Barbara Meitin Preschel

The growth of indexing services and of the need for indexes has emphasized the need for more knowledge of the indexing process itself. Indexing cannot become more scientific until the process is better understood and the products of individual indexing systems are more consistent. Consistency is necessary, even if not sufficient, for continuing progress in the field.

Previous studies of indexer consistency have defined it as the degree of replication in the index terms chosen independently by two or more indexers, or by the same indexer at different times, to label the informational content of a given text as a means of providing access to the information in the text. Indexer consistency scores have been primarily a measure of the degree of replication in the index terms so chosen.

This approach has resulted in measures that commingle, in an undifferentiated manner, indexer consistency in the two parts of the indexing process:

1. Indexer perception of indexable concepts;

2. Indexer choice of terminology with which to label the concepts perceived.

This study postulates:

1. That definitions of indexer consistency should state that it consists of indexer consistency in each of the two parts of the indexing process listed above;

2. That these parts can be measured separately;

3. That there will be a gross difference in the degree of each;

4. That indexer consistency scores should be determined by a planned use of both measurements.

For the purposes of the study, copies of 550 journal articles were separated into 22 packets of 25 articles each. All the articles in each packet were read by each of five indexers who were instructed to identify and label the concepts discussed in each article.

When the analysis of a given packet had been completed by the indexers assigned to it, concept categories were established for each article based on the concepts perceived by the indexers.

The labels created by each indexer for each article were then examined to discover which concept categories, of all the concept categories established by all the indexers for that article, were included in the labels an individual indexer had created for that article.

Each indexer was then paired successively with every other indexer for the article and a mean inter-indexer concept consistency score for all pairs for each article was established.

The terminology of each of the labels created by each pair of indexers for each article was then compared and a mean inter-indexer terminology consistency score for all pairs for each article was established.

For each of the articles in the study, the mean inter-indexer consistency in identification of concepts score was significantly higher than the mean inter-indexer consistency in choice of terminology score. In 500 of the 550 articles, it was 21.0 percentage points or more higher. Scores of mean inter-indexer consistency in choice of terminology ranged from 0.0% to 30.0%. Scores of mean inter-indexer consistency in the perception of concepts ranged from 9.4% to 84.0%. The statistical findings of the study revealed a pattern in which the mean terminology consistency scores clustered at the low end of the indexer consistency percentile range and the mean concept consistency scores clustered at the middle or upper end.

These findings indicate a need for a re-examination of the problem of indexer consistency and its relation to:

1. Tests of the effectiveness and efficiency of indexing languages and systems, since the findings of these tests would undoubtedly be affected if indexer consistency in

perception of indexable matter was overtly one of the variables studied;

2. Index tools and methodology, in particular instructions to indexers on the construction and use of thesauri and instructions on what kinds of concepts are indexable concepts;

3. Index research, much of which has concentrated on terminological relationships, to the neglect of concept-related problems;

4. Indexer predictability (consistency) as a factor in indexer-user consistency in choice of concepts or terms for the retrieval of indexed information.

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CHAPTER I

INTRODUCTION

The Problem

Indexing, and an understanding of indexing procedures, is basic to information flow. This study is concerned with an elemental aspect of indexing methodology: the identification of indexable matter and its expression for purposes of communication. It is concerned with the definition of the term "indexer consistency" and with the use of this definition in establishing quantitative measurements of indexer consistency.

Previous studies have defined indexer consistency as the degree of replication in the index terms chosen independently by two or more indexers, or by the same indexer at different times, to label the content of a given text as a means of providing access to the information in the text. These studies will be discussed in detail in Chapter II.

This study postulates that:

1. The process of indexing has two parts

   A. Indexer perception of indexable matter (indexable concepts) in the texts to be indexed; and

   B. Indexer characterization of the perceived indexable matter in words;

2. Indexing is an order-dependent technique in that a concept must be perceived before it can be expressed in an index term;

3. Perception of concepts is a process distinct from the process of choosing terms with which to characterize the concepts perceived;

4. There may be more than one indexing term that will accurately characterize a given concept.

It therefore postulates that indexer consistency should be defined as having two parts:

1. Indexer consistency in the perception of indexable matter;

2. Indexer consistency in the choice of term with which to label the indexable matter perceived.

The Hypothesis

The hypothesis to be tested was that the degree of indexer consistency in the perception of indexable matter can be measured separately from and will be different in extent from the degree of indexer consistency in the terminology chosen to characterize that indexable matter.

Background of the Problem

The process by which subject indexers choose the index entries or verbal labels that will facilitate the location of information bearing material has been described as follows.

> It is convenient to think of subject indexing as a two-step operation:
> 1. Deciding what a document is about (i.e. its subject matter);

2. Translating this conceptual analysis into index terms which act as shorthand symbols, or labels, for the subject matter of the document.[1]

Indexing can be regarded as a two-part process. First, it is necessary to decide what are the essential ideas of a document that have to be recorded to describe it. Second, this essence of the document has to be recorded in a standard way.[2]

Charles L. Bernier divides his analysis of the subject indexing process into four parts:

> Apparently, a subject indexer does four things so rapidly and smoothly that even he may be unaware of this detail. First, he selects subjects suitable for indexing -- according to the policy and rules of the organization for which he works. Second, he paraphrases the subject. The paraphrase is the verbal embodiment of the subject which at the time of selection may not exist in the form of words in the mind of the indexer. Third, he provides guides to his paraphrases of the subject. These guides are statements (embryonic index entries) starting with the word or term that seems most closely associated with the subject and followed by an expression that makes the word or term sufficiently specific to enable the reader to decide whether or not he needs to consult the reference from the entry. Fourth, he translates these guides into standard index terminology so as to avoid the bane of all poor indexes -- scattering of like information.[3]

It can be seen that part 1 of Bernier's analysis corresponds to the first part of Lancaster's and Shaw and Rothman's analyses, and Bernier's parts 2,3, and 4, correspond to the second part of the other analyses quoted above.

These investigators make the same distinction between a concept and the term used to characterize, name, or label

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[1]F. Wilfred Lancaster, Information Retrieval Systems (New York: John Wiley and Sons, Inc., 1968), p. 3.

[2]T. N. Shaw and H. Rothman, "An Experiment in Indexing by Word-Choosing," Journal of Documentation XXIV (September 1968): 159.

[3]Charles L. Bernier, "Indexing and Thesauri," Special Libraries, LIX (February 1968): 99.

the concept as do such semanticists as Korzybski, Ogden, Richards, Ullman, Hayakawa, and Nida.

This semantic distinction between a concept and the term used to label the concept may be thought of as the basis for the division of the indexing process into two parts.

Objectives of this Study

The purpose of this study is to demonstrate that even though two or more readers of a given text may have identified the same concepts in the text, they may express the concepts in differing terminology; and therefore indexer consistency studies that use consistency in choice of terminology as their only apparent criterion in determining degree of consistency are unconsciously presenting a measure that commingles the two kinds of consistency. This is not to say that the directors of these studies were unaware of the difference between a concept and the term used to symbolize it, but that they did not consciously distinguish between them in their definitions and measurements. The measurements they spoke of as being based on degree of match in terminology also included indexer consistency in degree of perception of concept, but they did not overtly distinguish one from the other.

This study is designed to show that there is a significant difference in the degree of indexer consistency in perception of indexable matter (concepts) and the degree of indexer consistency in choice of terminology with which to describe that indexable matter; that this difference in degree will be large enough to be of importance in the invest-

igation, evaluation, and construction of indexing systems; that each of these types of indexer consistency should be separately identified and included in the determination of an overall measurement of indexer consistency; and that this ability to investigate the two facets of indexer consistency separately may lead to improvement in indexing techniques and tools, and increased consistency (predictability) in both indexer choice of indexable matter and indexer choice of terminology.

Presentation of Study

Chapter II is devoted to an examination of previous studies of indexer consistency. They are examined as a group, reviews of indexer consistency studies are discussed, and certain individual investigations of indexer consistency which have particular meaning for this study are reported on in detail.

Chapter III describes the methodology used in this study. The procedure used in choosing the textual material that was analyzed, the characteristics and training of the people employed as indexers, the data analysis procedures, and the mathematical formulas and methods used in determining the stated indexer consistency scores are explained.

Chapter IV discusses the concept categorization process. The process is explained, and examples illustrating the process and the problems encountered are given.

Chapter V discusses the findings of the study in terms of the results of the statistical methods used. Statistics

for various aspects of the study are displayed and discussed.

Chapter VI presents a summary of the investigation and conclusions drawn from the findings, and a discussion of some of the implications of the study.

CHAPTER II

PREVIOUS STUDIES OF INDEXER CONSISTENCY

General Discussion of Previous Studies of Indexer Consistency

The library and information science communities carried out a number of formal studies of indexer consistency in the early 1960's. A list of indexer consistency studies since 1960 will be found in Appendix A. In this chapter, these studies will first be considered as a group. A number of them will then be discussed individually. Special features or aspects of the studies will be discussed, but the primary reason for considering them here is to demonstrate that they define indexer consistency as the degree of replication or match in the terminology chosen to characterize the informational content of the texts.

Although all of the studies use degree of replication or match in terminology as the criterion of degree of indexer consistency, some define a match in terminology more liberally than others. For example, some of the studies consider the singular and the plural forms of a given word as an "exact" match, some do not.

Some of the reports discuss concepts as entities separate from the terms used to label them, but in their

analyses and measurement of indexer consistency, they have all used the degree of match of the terms finally selected as the deciding factor in determining degree of consistency. Essentially, this procedure presents a combined measure of consistency in concept identification and consistency in its expression.

In many cases, primarily those testing indexer consistency within or between actual working indexing systems, lists of terms were supplied to the indexers so that they could choose terms from the list.

In these cases, degree of match in terminology was also a function of the precision with which the terms on the list were defined or understood by the indexer and the degree of overlap in the meaning of individual terms. This was not always indicated in these studies. Tinker's studies, which will be discussed later in this chapter, are actually concerned with the measurement of the degree to which indexers understand the precise meaning of terms from a list, as this understanding is reflected in consistency in choice of terminology.

In the studies in which lists of authorized terms were given to the indexers, this kind of vocabulary control undoubtedly exerted an influence on the final indexer consistency scores. The extent of this influence, or even the kind of influence exerted by lists of authorized terms, is not a variable examined in the study reported on here.

In tests of indexer consistency where no pre-established lists of terms were provided, the emphasis was usually placed on such variables as the size of the texts indexed, the depth of indexing, the conditions under which the indexing was done, or the type of training or indexing aids provided the indexers.

In all of these studies, textual material (abstracts, titles, full articles, patents, sentences) was indexed more than once and the consistency with which terms defined as matching terms were chosen to characterize the informational content was computed for each indexing of the text.

The findings of these studies are not statistically comparable and so cannot be used for comparison judgements. Such factors as testing conditions, measures of consistency, experience and education of the indexers, indexing aids, depth of indexing required, size of universe indexed, type and size of text indexed, indexing system and terminology, subject area, and stated objectives of the studies are quite disparate. There is great disparity in the studies' definitions of what they consider a "match" in terminology. In some studies, there is no definition as to what constituted consistency of terminology. In some studies, it was defined ambiguously. In some studies, distinctions were made between consistency in the choice of "significant terms" and consistency in the choice of "peripheral terms". (The Zunde and Dexter study which is discussed later in this chapter is an example of this.) In some cases the

statistical methodology used was not stated.

Reports on Studies of Indexer Consistency

Two studies of indexer consistency have attempted to gather and compare other studies.

St. Laurent Review

The review of the literature of indexer consistency done by Mary Cuddy St. Laurent as a Master's thesis at the University of Chicago Graduate Library School in 1966 discusses and evaluates reported work up to that time. She reaches the conclusion that, "The studies that have been made of indexer consistency . . . do not allow any actual comparison of the results they contain."[1] She blames this on the over-all design of the studies, the lack of definition of variables, and the disparity in the measures used to compute indexer consistency. She does not specifically discuss the fact that all of the studies define "indexer consistency" as consistency in final choice of terminology, but in her introduction, she states that

> Consistency refers to the amount of agreement on the number of terms considered sufficient to represent the significant concepts of a document and to the proportion of matched terms among indexers.[2]

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[1]Mary Cuddy St. Laurent, A Review of the Literature of Indexer Consistency (Chicago: University of Chicago Graduate Library School, 1966), p. 26.

[2]Ibid., p. 7.

The use of the phrase "amount of agreement on the number of terms" may be thought of as an unconscious attempt to discover how many indexable concepts each indexer perceived. If each term is assumed to label one indexable concept, and one indexer uses five terms for a given text, while another uses ten terms, it would mean that the first indexer perceived half the number of indexable concepts that the second indexer perceived. None of the studies discuss "number of terms assigned" as indexer perception of indexable matter, however.

The use of the phrase "proportion of matched terms" indicates that, as in other studies of indexer consistency, St. Laurent thought of "indexer consistency" primarily as a measurement of the degree of match in terminology.

Hooper Study

In his study of indexer consistency studies, R. S. Hooper reviewed 17 reports of indexer consistency tests, concentrating his attention on their method of measuring indexer consistency.[3] He states:

> There is no standard measure of consistency. Reports which quote indexer consistency values often do not state how the values were computed. Therefore, we shall define and express mathematically the consistency measures which we derive essentially from the information reviewed in the seventeen reports. Where raw data was given, in any of the seventeen reports, consistency values were re-computed in terms

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[3] R. S. Hooper, Indexer Consistency Tests - Origin, Measurements, Results and Utilization (Bethesda, Md.: IBM Corporation, 1965).

> of one of these measures. In other reports, the author's value is reported and suffixed with a "CX" to indicate that the exact meaning of the consistency value cannot be interpreted from information within the report.[4]

Hooper was actually able to recompute consistency scores for only six of the tests by using raw data available in reports of the tests with equations he developed for the purpose.

Hooper does not give a formal verbal definition of "indexer consistency" but does give the equations he uses to arrive at his measure of it. These equations are based on terminology:

> The consistency of a pair (CP) . . . , that is, the consistency of one indexer with respect to a second is based on the number of times the two indexers agree on the use of a term, divided by the total number of terms used by either indexer (based on the specific document).

$$CP(\%) = \frac{100A}{A + M + N}$$

where, A = the number of term agreements between 'M' and 'N' for a specific document
M = the number of terms used by 'M' but not used by 'N'
N = the number of terms used by 'N' but not used by 'M'.

The consistency of an individual with respect to a group (CG), that is, the consistency of any one indexer with respect to all other indexers (assuming more than two indexers exist) may be computed by finding the mean of all pair consistency (CP) values between the one indexer and all other indexers (who have indexed the same document).

$$CG_1 = \frac{CP_{12} + CP_{13} + \ldots + CP_{1n}}{n - 1}$$

where, CP_{12} is the consistency (CP) between indexer 1 and 2
CP_{13} ... etc.

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[4] Ibid., p. 3.

n is the number of indexers.[5]

Hooper states that:

> Inconsistencies may result from a disagreement as to the number of index terms which should be used to represent a given document, or from a disagreement among indexers as to which specific index term should be used to represent a specific theme or concept within a document.[6]

In other words, Hooper sees two variables affecting indexer consistency.

The first is the number of index terms assigned by each indexer to a given article. This is what Harris, Rayward, and Svenonius, in a study done under Swanson's direction, which is discussed later in this chapter, use as their definition of indexing depth. Hooper does not define number of indexing terms assigned as "indexing depth". He does not actually define "indexing depth". However, he states that he equates depth of indexing with choice of indexable matter. "The problem of depth of indexing is simply the problem of deciding which concepts or themes within a document are worth indexing."[7]

Depth of indexing and perception of indexable matter are not synonymous, as Hooper states. Depth of indexing, if it is defined as number of index terms assigned, may be a function of perception of indexable matter, but it is just as likely to be a function of the rules of the indexing system

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[5]Ibid., p. 3-4.

[6]Ibid., p. 2.

[7]Ibid., p. 10.

within which the indexing is being done. For instance, if an indexer's instructions are to assign a maximum of five index terms to a particular text, the terms he chooses will represent different concepts, often concepts of a higher generic level, than if his instructions are to assign a minimum of eight and a maximum of twenty index terms to the same text. In the first instance, he might assign a term like "fish"; in the second he might assign a term like "fish", but also several terms like "mackerel" and "trout".

In indexing systems in which a certain number of terms are prescribed for each item indexed, an indexer is forced to re-adjust his personal decisions as to appropriate indexing depth with differences in the length of the texts he indexes. If he is asked to use five index terms per item, and one item is one page long, while another is twenty pages long, the breadth or narrowness of the concepts he chooses as indexable may vary since he may be forced to choose broader concepts for the long item and narrower concepts for the short item to arrive at the designated number of terms for each item.

The type of index terms allowable in the information system in which the indexer works may affect the number of terms he assigns. In a pre-coordinate index system, an authorized index term might be: "Probationers, psychological tests." One index term would be used. In a post-coordinate index system, the same information might require two index

terms: "Probationers" and "Psychological tests".

Indexer's instructions are, of course, not limited only to the number of terms he should assign to a given item. They also may instruct him to index only the main topic(s) of the item when taken as a whole (H. W. Wilson), or to index only new material (Chemical Abstracts). These kinds of instructions, and others not mentioned here, may affect the kinds of concepts an indexer perceives as indexable as well as the breadth, specificity, or number of the concepts he perceives as indexable.

The second variable that Hooper says affects indexer consistency is a disagreement among the indexers as to which specific index term should be used to represent a specific theme or concept within a document.

This applies directly to the problem investigated in the present study. How great an effect does indexers' disagreement as to which index term should be assigned to a particular concept have on measurements of over-all indexer consistency?

Hooper also states that his review of indexer consistency studies showed that, "There was a large disagreement among indexers as to what information within a document should be indexed."[8]

This statement also applies directly to the problem investigated in the present study. Granted that there is

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[8]Ibid.

disagreement among the indexers "as to what information within a document should be indexed", how large is the degree of disagreement and is it significantly less than their degree of disagreement in choice of terminology?

Despite his statements about indexer perception of indexable matter and indexer disagreement in choice of term with which to describe a given perceived concept, Hooper used agreement in use of terminology as his only stated measure of indexer consistency.[9]

For the indexer consistency studies Hooper reviewed in which the degree of inter- or intra- indexer consistency was expressed as a percentage, the indexer consistency scores were as follows.

The scores for studies a, d, e, f, g, and o represent scores Hooper derived using his own formulas on raw material found in the reports of the studies. In each case, the score Hooper got from his recomputation was the same as or lower than the score originally reported by the director of the study. The scores for studies b, c, i, k, l, m, n, and q represent scores given in the original reports of the studies.

The range of the scores seems to indicate either:
1. That there is an enormous range in indexer consistency, or
2. That there is a lack of agreement on what the variable "indexer consistency" actually consists of and that this

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[9]Ibid., p. 3-5.

affects the scores.

TABLE II - 1

INDEXER CONSISTENCY SCORES RECORDED IN HOOPER STUDY[10]

Indexer Consistency Score	Hooper's Designation
10%	Study b (Jacoby)
18%	Study i (MacMillan and Welt)
24%*	Study a (Rodgers)
35-45%	Study c (Slamecka and Jacoby)
36-59%	Study m (Korotkin and Oliver)
40%*	Study e (Painter AEC)
42%*	Study g (Painter OTS)
46%	Study n (DDC)
48%*	Study d (Painter ASTIA)
59%	Study l (Rodgers)
70%	Study k (Kyle)
70%*	Study f (Painter NAL)
73%	Study q (Bryant, King and Terragno)
80%*	Study o (Hooper)

*Studies for which Hooper recomputed the scores using his own formulas on the raw data found in the studies.

These studies were of interest in the situations in which they were done. They presented information of value to the investigators who conducted them. But they present an uneven base from which it is difficult if not impossible to draw any generalizations on indexer consistency except that, as previously studied, indexer consistency presents an inconsistent character.

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[10] Ibid., p. 12-19.

Individual Tests of Indexer Consistency

Rodgers Study

One of the earliest of inter-indexer consistency studies is that by Dorothy J. Rodgers, completed in 1961. She selected twenty articles concerned with the organization of information for storage and retrospective search. One of the reasons these articles were selected was

> . . . that H. P. Luhn had published his computer-generated 'auto-abstracts' and keywords selected on the basis of frequency from this set of documents. This made it possible to compare the words selected by ISO technicians with those selected by Luhn's statistical system.[11]

(ISO technicians are technicians who work in the Information Systems Operation, a part of the General Electric Company.)

Eight individuals indexed these twenty articles by selecting "those key words from the documents that he might later use in retrieval."[12] These were literally single words, acronyms, or in one case, a personal name.

The words selected by each of the eight were then compared and various analyses were conducted based on the degree of replication in the keywords chosen by each of the analysts; the number of keywords chosen by each; the length of the article in relation to the number of keywords chosen; the physical position of these words in the document (whether they appeared in the title, sub-title, abstract, or the body

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[11] Dorothy J. Rodgers, A Study of Inter-Indexer Consistency (Washington, D.C.: General Electric Company, 1961), p. 8.

[12] Ibid., p. 10.

of the text); and the proportion of words selected both by Luhn's frequency count procedure and by the human indexers out of the total universe of keywords selected by both methods.

Rodgers states that "Consistency is here defined as the number of topics which two or more indexers independently select as an important topic from an article."[13] The word "topic" is not defined, but it is apparent that "key word" and "topic" are viewed as interchangeable by Rodgers since all the analyses are based on similarity or dissimilarity of key words. She also states in her summary that "The key words selected were analyzed to determine the degree of agreement among indexers in terms of choice of key words."[14] It appears that degree of agreement in choice of individual text words was the criterion for the establishment of degree of indexer consistency. This was, of course, not really a test of indexer consistency in a precise sense, since the objective was to choose keywords that the person might later use for retrieval, not terms for index access (terms which may have been composed of more than one word).

The mean inter-indexer consistency score for the eight indexers and the twenty articles in the study was 24%. Consistency scores for each article ranged from 16% to

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[13] Ibid., p. 6.

[14] Ibid., p. 21.

38%.[15]

The mean consistency score for Luhn's method in relation to the human indexers was 15%.[16]

Agreement in choice of terminology was the criterion for the establishment of degree of indexer consistency.

Painter Study

One of the better known of the indexer consistency studies listed in Appendix A is that done by Painter as a part of her doctoral dissertation.[17] For the purposes of her study, various government agencies re-indexed reports they had indexed previously. The Office of Technical Services re-indexed thirty-two items; the Armed Services Technical Information Agency, ninety-four; the Atomic Energy Commission, ninety-six items; and the National Agricultural Library re-indexed ninety-nine items. There was no attempt to have the indexer who had originally indexed the item re-index it.

Indexer consistency was defined as a match in terminology. Singular and plural forms or adjectival and noun forms of the same word were considered as matching. The

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[15] Ibid., p. 54.

[16] Ibid., p. 59.

[17] Ann F. Painter, Analysis of Duplication and Consistency of Subject Indexing Involved in Report Handling at the Office of Technical Services, U.S. Department of Commerce (Washington, D.C.: U.S. Office of Technical Services, 1963).

highest consistency recorded was 72% at the National Agricultural Library; the lowest was 44% at the Atomic Energy Commission.

This wide variation in indexer consistency scores occured despite the fact that Painter used the same techniques and definition of indexer consistency throughout her study.

Both the National Agricultural Library and the Atomic Energy Commission used lists of authorized terms as indexer aids. The Atomic Energy Commission used a traditional subject heading system. The National Agricultural Library used the subject headings established in the subject index to the previous year's Bibliography of Agriculture.

Painter states that

> The duplicate indexing investigations tabulated and studied . . . were attempts . . . to determine the degree of equivalency in the terminologies. Essentially the comparisons were made of matches, which were similar in appearance rather than concept (synonymous), but where different words were used for the same concept there was some attempt to record the fact. For the most part, it includes only the straight word-for-

word match allowing for grammatical differences.[18]

Painter was aware that more than one term could be used to label a particular concept, but chose to base her judgements of indexer consistency in this study primarily on terminology. This is, of course, in keeping with other studies of indexer consistency. Allowing for grammatical differences, here as elsewhere, may be a partial recognition that consistency in concept identification does not necessarily result in consistency in terminological expression. Here, as elsewhere, however, the two are commingled in the final results.

Saracevic and Goldwyn Study

In this study by Saracevic and Goldwyn[19], fifty abstracts were indexed using keywords as the indexing language. Indexers were divided into four groups of experienced indexers (these groups were based on the type of indexing language the indexers had used previously) and a fifth group of inexperienced indexers.

> The inter-indexer consistency for one indexer with all other indexers in the group was calculated by taking the mean Indexing Consistency measures of that particular indexer with every other indexer in

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[18]Ibid., p. 100.

[19]Tefko Saracevic and A. J. Goldwyn, An Inquiry into Testing of Information Retrieval Systems, Part I: Objectives, Methodology, Design and Controls (Cleveland, Ohio: Case Western Reserve University Center for Documentation and Communication Research, 1968).

the group . . . .[20]

thus setting up pairs of indexers in which each indexer was paired with every other indexer in his group. A simple formula was used to arrive at a measure of consistency for each pair of indexers:

$$\text{Indexing Consistency} = \frac{\text{Number of Terms in Agreement}}{\text{Total Number of Unique Terms}}$$

A match in terminology (keyword) was the only criterion for indexer consistency. No indication is given in the paper to show whether "keyword" in this case meant individual words, or included multi-word terms.

Average inter-indexer consistency ranged between 34.9% and 63.5%.[21] There was no attempt to arrive at a measure of consistency in identification of indexable concepts.

The formula used by Saracevic and Goldwyn is both simple and effective. The formulas used to measure consistency of both concept and terminology in the investigation described in this report are based directly on it.

Jacoby and Slamecka Study

Jacoby and Slamecka contrasted the indexing of experienced and inexperienced indexers.[22] They also

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[20]Ibid., p. 117.

[21]Ibid., p. 119.

[22]J. Jacoby and V. Slamecka, Indexer Consistency Under Minimal Conditions (Bethesda, Md.: Documentation, Inc. 1962).

measured indexer consistency by degree of match in terminology, "the consistency with which indexers tend to choose the same terms as being descriptive of the same documents."[23]

They first measure this "under artificial conditions which excluded the use of indexing tools, communication, and post-indexing editing . . . ."[24] Later, they measured the intra-indexer consistency of the indexers when "re-indexing 'equated' documents and using a vocabulary of 'general' (shared) terms."[25] Consistency rates for these studies ranged from 41% to 69.5%.

Tinker Studies

Tinker has reported two studies relating to indexer consistency.[26, 27] His primary focus was on precision of meaning in terminology and he equates the consistency with which indexers applied certain terms to a given document to the precision of the indexers' understanding of the meaning of the terms.

> Through measuring the consistency with which a term is applied to a concept, we are able to assess whether or not its meaning is understood with precision. By having a number of abstracts indexed by a

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[23] Ibid., p. IV.

[24] Ibid.

[25] Ibid.

[26] John F. Tinker, "Imprecision in Meaning Measured by Inconsistency of Indexing," American Documentation XVII (April 1966): 96-102.

[27] John F. Tinker, "Imprecision in Indexing, Part II," American Documentation XIX (July 1968): 322-30.

> number of people, it is possible to discover the consistency with which a given indexing term was used and hence, how well the meaning of the term was understood.[28]

He uses the degree of indexer consistency in use of terminology as a means of measuring indexers' degree of understanding of the precise meaning of the terminology.

In the first study reported, fifteen indexers were asked to choose descriptors for fifty abstracts. They were not given a list of terms or any instructions for making a choice of terms. This resulted in a list of 1,050 different words or phrases. When a selected list of one hundred of these words or phrases was given to the same indexers and they applied these to the same fifty abstracts, Tinker states that: "The consistency of application increased markedly, and 6 of the terms were used with perfect precision."[29]

Tinker

> . . . proposes that meaning can be defined as the relevance of a word to the concept that it labels . . . . By assigning a descriptor [Tinker defines 'descriptor' as a synonym for 'index terms'] to a document, the indexer asserts that the descriptor has a high degree of relevance to the content of the document; that is, he asserts that the meaning of the descriptor is strongly associated with a concept embodied in the document, and that it is appropriate for the subject area of the document. Let us assume that the indexers assign the descriptors in the order of the degree of relevance to the concepts, or that they assign all of the descriptors that they believe

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[28]Tinker, op. cit., (1966), p. 97.

[29]Ibid., p. 101.

> have a high degree of relevance. Then the consistency with which a given degree of relevance is associated with a given descriptor-concept pair will reflect the precision of the association strengths. Hence, consistency of indexing serves as a measure of the precision of meaning.[30]

Tinker assumes that only one of his 100 indexing terms will be a "precise" surrogate or label for a particular concept in the abstracts indexed. He equates the assignment of this term to the abstract as an indication that the indexer perceived an exact one-to-one relationship between the concept and the term. He assumes that in a given field of knowledge there may be degrees of relevance of terms to concepts, but that in his list of indexing terms, there is one term which will have a 100% association factor with a given concept in the abstracts indexed.

This is why he equates the consistency with which a group of indexers assign a term to an abstract with the degree to which the indexers understand the meaning of the term precisely. If all indexers apply or fail to apply the term, there is 100% precision of meaning in their understanding of the term. If they are divided in their application or non-application of the term, there is not 100% precision in their understanding of the meaning of the term.

Tinker states that the findings of his 1966 study indicate "that a drastic reduction in the number of allowed

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[30]Ibid., p. 97.

indexing terms would increase the precision with which the terms would be used."[31] It seems obvious, of course, that if the number of possible choices in terminology are reduced from near infinity to 100, or even from 1,000 to 100, the statistical odds on choosing the same terms would increase significantly even if all other factors were equal.

In the 1968 study, Tinker begins by discussing the findings of his 1966 study, but states that:

> . . . a limited and inflexible set of indexing terms has serious disadvantages . . . a small set of indexing terms is limited in the richness of description it is capable of. Clearly, limiting the choice of indexing terms to a small set is unsatisfactory.[32]

Tinker therefore established a small set of indexing terms for the use of the indexers in the study, but allowed them to add modifiers to the terms.

> . . . . the indexer was required to choose broad terms for a short list, then freely assign modifiers to the terms, so that the combination of terms and modifiers described the document and distinguished it from the others in the file.[33]

In the study reported in 1968, Tinker assigned thirteen abstracts of articles in the field of photographic science to nineteen indexers.

> The indexers were given an authority list of only 34 terms, which together form a classification of photographic science. They were asked to choose descriptors from this list and freely add modifiers.[34]

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[31] Tinker, op. cit., (1968), p. 322.

[32] Ibid.

[33] Ibid.

[34] Ibid., p. 326.

Tinker's objective was to learn whether an authority list to which indexers might freely add modifiers would increase or decrease precision of meaning as indicated by the consistency with which the indexers assigned a given term to a given text.

Tinker states:

> If all the indexers have the same understanding of the meaning of a term, they will unanimously apply it, or fail to apply it, to each abstract. The extent to which they deviate from this unanimity is shown on a graph showing the fraction of indexers applying the descriptor as the ordinate. The abscissa of the graph is the rank of an abstract, so that the curve rises to the right. We can define perfect understanding and perfect precision of meaning as yielding a rectangular curve -- one with points only at 0 and 100%.

Tinker gives, as an example, a graph derived for the descriptor: emulsion technology.

> It is a term that would be expected to have high precision among these indexers, since it describes a subject area in which they are competent. The graph shows that the term is not used with perfect precision, since it is not a rectangular curve. Furthermore, the imprecision is about the same as is observed when terms are chosen freely . . . . [As in the 1966 study]
>
> The use of an authority list, in the way we have explained, does not increase the inherent imprecision of words.[35]

One would also have to add that it did not appear to decrease it.

Tinker was not studying indexer consistency in these investigations. However he used degree of indexer consistency as his criteria for the measurement of degree of precision in meaning.

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[35]Ibid., p. 329-330.

Tinker's studies assume that consistency of indexing is dependent on replication of terminology. He states: "If all the indexers have the same understanding of the meaning of a term, they will unanimously apply it, or fail to apply it, to each abstract."[36] He fails to state that they may not apply it if they do not see it as expressing the indexable matter in the text. He is also assuming that indexers will perceive the same content although they may express it differently, and that only one term in an authority list is appropriate for one concept. This is not necessarily so. It is possible that not only will indexers use different words for the same concept and use the same word for differing concepts, but, based on the data of this study, they may also disagree on which concepts in a given text are indexable. Perhaps Tinker's use of abstracts rather than full texts as the documents to be indexed has some bearing on this matter. Although Tinker's studies are among the most interesting of the studies of indexer consistency, once again, indexer consistency is measured only in terms of replication of terminology.

Zunde and Dexter Studies

Zunde and Dexter have also reported two studies of indexer consistency. The first, reported in 1969, was concerned with developing a measure of indexer consistency

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[36]Ibid., p. 329.

which would "assign a higher consistency value if indexers agree on the more important terms than if they agree on less important terms."[37] The degree of importance of a particular term in relation to the content of a particular text was defined as equal to

> . . . the degree of consensus of indexers in selecting a term . . . . In other words, the more indexers select a given indexing term, the more representative it should be considered with respect to the contents of the document.[38]

Zunde and Dexter conclude:

> Measures of indexing consistency should reflect not only the formal agreement of indexers on a number of terms, but also the significance of terms on which the indexers agree or disagree.[39]

Zunde and Dexter thus opened a meaningful area for investigation. Indexer consistency in choice of highly significant terms is certainly more important than indexer consistency in choice of less significant terms. The problem lies in the definition of "significant". If a "significant" term is defined as one which has been chosen by two or more indexers, can indexer consistency in choice of "significant term" be defined as the degree of duplication in the terms chosen by two or more indexers? This would seem to be circular reasoning, defining each variable in terms of the other.

Zunde and Dexter used two equations to measure indexer consistency in this study. The equation which

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[37]Pranas Zunde and Margaret E. Dexter, "Indexing Consistency and Quality," American Documentation XX (July 1969): 259.

[38]Ibid., p. 262.

[39]Ibid., p. 266.

> . . . reflects the agreement of a group of indexers on the significance of the selected terms, produced on the average higher consistency values than the measure given by . . . [the second equation] . . . which does not reflect any judgement of significance of the terms.[40]

Twenty-nine biomedical documents were indexed by eight professional indexers and eight scientists; and nine student indexers indexed sixteen documents. In the first instance, a list of terms was supplied to which the indexers could freely add terms. In the second instance, no list of terms was supplied to the indexers. It is not clear from the report what effect, if any, this had on consistency scores since it is not considered separately from other variables in the study. Consistency scores ranged from less than 10% to 59%.[41]

The second study reported by Zunde and Dexter[42] investigates the relationship between the readability of a document and consistency or quality of indexing as measured by the equations developed in their first study on the data used in their first study. (The measure of readability used is the one proposed by Rudolph Flesch in 1948.[43])

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[40] Ibid., p. 263.

[41] Ibid.

[42] Pranas Zunde and Margaret E. Dexter, "Factors Affecting Indexing Performance", Proceedings of the American Society for Information Science, VI (1969): 313-322.

[43] Rudolph Flesch, "A New Readability Yardstick," Journal of Applied Psychology, XXXII (1948): 221-233.

The above study also investigated the effect of the temperature of the work area on the indexing performance of a group of graduate students indexing Reader's Digest articles.

Neither the readability of the documents nor the room temperature were shown to influence indexer consistency to a significant extent.

Both Zunde and Dexter Studies define consistency of indexing as

> . . . the degree of agreement within a group of indexers in the representation of essential information content of the document by certain sets of indexing terms selected individually and independently by each of the indexers in the group.[44]

Once again, replication of terminology is the criterion for the definition of indexer consistency.

Cooper Study

Cooper's study[45] differs from the ones cited previously because it is not based on actual indexing. Rather, it is a closely reasoned discussion based on various mathematical models and equations. However, in common with all the other investigators previously cited, Cooper used consistency in choice of index terms as the basis for his definition of indexer consistency.

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[44]Zunde and Dexter, op. cit., p. 313.

[45]William S. Cooper, "Is Interindexer Consistency A Hobgoblin?", American Documentation XX (July 1969): 268-278.

> For any allowable index term, there will be a certain proportion (possibly none) of the indexers who have assigned the term to the document, and a remaining proportion who have not. We define the <u>interindexer consistency</u> with respect to the given term and document to be the larger of these proportions minus the smaller. . . . For example, if 90% of the indexers assign the term to the document, the consistency is C = 90% - 10% = 80%, for that term. Also, if 90% of the indexers do not assign the term to the document, the consistency will again be 80%, for it is only the amount of agreement which is of interest, not the nature of the agreement. The definition assigns a consistency rating of 100% (the maximum possible) in case all the indexers are unanimous in assigning the term to the document and likewise 100% in case they are unanimous in not assigning the term.[46]

Cooper continues his discussion and explores various other aspects of the problem of indexer consistency, but in accordance with other investigators, he defines indexer consistency as consistency in terminology, which represents both choice of concept and means of expression. Concept choice is, however, implicitly considered as Cooper introduces the idea of non-use of a term as part of consistency. He never expresses this, however, in terms of the two distinct operations in the indexing process.

Cooper's statement that

> . . . the phenomenon of interindexer consistency is devoid of practical interest unless it can be shown that it has something to do with indexing quality and ultimately with retrieval effectiveness. . . .[47]

should certainly also be mentioned here. He is right in contending that studies of indexer consistency are of little

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[46]Ibid., p. 271.

[47]Ibid., p. 268.

interest unless indexer consistency can be related to retrieval effectiveness.

He states that if interindexer consistency is improved at the expense of indexer-requester consistency, information retrieval effectiveness will be impaired. That is, if indexers in a given information retrieval system become consistent in their assignment of index terms, but these terms differ from the terms used by the system's patrons in their requests for information, then the goals of the information retrieval system and the effectiveness of information retrieval will be impaired. He hypothesized that:

> If method B produces a higher level of interindexer consistency than A, and at the same time the indexer-requester consistency attained under B is as high as that attained under A, then the use of B results in greater retrieval effectiveness than the use of A.[48]

His conclusions are that although at present, not enough is known about indexer consistency for it to be used as a gauge of indexing quality, it "has a definite and mathematically analyzable relationship with retrieval success."[49]

It is possible that a situation might occur in which an indexing term is assigned to a given article by an indexer even though it is not an accurate label (in a dictionary sense) for the particular subject concept it is meant to characterize. However, if there is a good syndetic appa-

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[48]Ibid., p. 270-1.

[49]Ibid., p. 277.

ratus, or if the requesters are aware that this particular index term is assigned consistently to identify this particular concept, the requesters will use it when they want to retrieve information on that subject. An analagous example of this has been described by Herner as follows:

> The Library of Congress, for years, classified computers under Calculating Machines, completely ignoring non-numerical applications; however, you could always depend on books on computers being shelved with books on calculating machines in libraries using the LC classification and this made it a system. It was dependable -- or perhaps consistently undependable would be better.[50]

In this case, and probably in many others, it was more important for the label assigned to the subject to be assigned consistently than it was for it to be assigned accurately. In other words, it may be extrapolated that indexer-requester consistency may be enhanced when indexers are consistent in their assignment of terms to subject concepts if the requesters are aware of the way in which the term is assigned, whether or not the term is assigned accurately in a dictionary sense. In addition, the development of consistency in the sense of predictability is essential for scientific analysis of indexing and the development of the art. It may be assumed that the goals are both quality and predictability, since if no attention is paid to quality (i.e., value in locating information for real information seekers) achievement of complete predictability is a trivial goal.

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[50]Saul Herner, "System Design, Evaluation, and Costing," Special Libraries LVIII (October 1967): 577.

Harris, Rayward, and Svenonius Study

Harris, Rayward and Svenonius tested inter-indexer consistency at various indexing depths.[51] In their study, nine people each indexed three articles.

> . . . each person indexed each article with 50 terms, a term being a phrase of not more than 3 words. To see if depth of indexing was related to consistency each list of 50 terms was ordered by 6 depth levels: depth I consisted of those 5 terms which would have been used to index the article if only 5 terms were allowed; depth II consisted of 10 terms; depth III, 20; depth IV, 30; depth V, 40; depth VI, 50. (It was somewhat questionably assumed that given 10 terms to index an article, these 10 must include the 5 terms which would be chosen if only 5 terms were allowed.)[52]

Two of the three articles were two pages long; one article was five pages long.

Using fifty terms to describe the content of an article two pages long is an unusual indexing practice, but aside from this, the study is of interest because the investigators deliberately varied their definition of "consistency" to ascertain the effect this would have on their measure of percentage of indexer consistency.

They first define inter-indexer consistency as the "number of like terms selected by different people when indexing an article. . . percentage of exact ('machine-like') matches . . . ."[53] Then they change this definition to include successively

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[51] D. Harris, W. B. Rayward and E. Svenonius, The Testing of Inter-Indexing Consistency at Various Indexing Depths (Chicago: University of Chicago Graduate Library School, 1966).

[52] Ibid., p. 4-5.

[53] Ibid., p. 1.

1. Trivial variations in terms such as singular and plural forms of the same word,

2. Synonyms,

3. Hierarchically related terms.

Findings were that

> . . . variant match consistency showed on the average 6% improvement over exact match consistency. There was very little improvement using synonyms. Consistency based on matching hierarchically related terms was on the average twice as high as variant-match consistency and three times higher than exact match consistency . . .[54]

The following table, from an unnumbered page preceding page 7, gives the percentages of consistency they found.

TABLE II - 2

PERCENTAGE CONSISTENCY AND DEPTH OF INDEXING AS RECORDED IN HARRIS, RAYWARD, AND SVENONIUS STUDY

Depth Level	Exact	+ Variant	+ Synonyms	+ Hierarchy
I (5 terms)	13	24	26	45
II (10 terms)	18	22	23	48
III (20 terms)	12	18	18	42
IV (30 terms)	13	20	21	43
V (40 terms)	16	19	23	48

(Percentages for depth Level VI were not given)

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[54] Ibid., p. 6.

Varying the definition of "match" to include synonyms and hierarchically related terms may have been a way of attempting to include concept consistency in the measurements. This was not stated, however. It is unfortunate that this study represents work done on a sample of only three short articles.

The Harris, Rayward, and Svenonius study illustrates what is hinted at in many of the other studies.

1. As the definition of "indexer consistency" is varied from an exact word-for-word match in terminology to include matches that are more broadly defined, the resultant percentages of consistency rise. This is in keeping with the findings of this study, and this broadening of the definition of a "match in terminology", here as in some of the other studies, may be thought of as an indirect attempt to solve the problem directly attacked in this study.

2. Although previous studies of indexer consistency state they are measuring consistency in terminology, the effect of the varying definitions of indexer consistency used in the studies results in scores that are composed of mixtures of the two kinds of indexer consistency identified in this study, scores in which the two kinds of consistency are present in differing and uncontrolled degrees.

The investigators of these previous studies were unwilling to accept a word-for-word match in terminology as a definition of indexer consistency. However, they did not consciously use the distinction between the two parts of the

indexing process as the basis for a new definition. The result, as stated previously, is that the definitions they used and the scores they reported represent an undifferentiated mix of the two kinds of indexer consistency that are consciously considered separately, defined separately, and measured separately in this study.

Investigations of Indexing Methodology in Which Concept Categories Based on Synonymy Were Established

The Harris, Rayward, and Svenonius study is the only previous study of indexer consistency that considered and measured degree of synonymy of terms as a clearly defined variable. Although other reported indexer consistency studies have not investigated indexer consistency in perception of concepts except as an undifferentiated part of a general measure of indexer consistency. studies of other areas of indexing methodology have intentionally used concept-based, rather than word-based categories. Two of these studies are discussed at the end of Chapter IV in the detailed discussion of the concept categorization process used in this study.

These studies[55, 56] investigated the degree to which the words in the title of an article might be said to repro-

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[55]Christine Montgomery and Don R. Swanson, "Machine-Like Indexing by People," American Documentation XIII (October 1962): 359-366.

[56]Donald H. Kraft, "A Comparison of Keyword-in-Context (KWIC) Indexing of Titles With a Subject Heading Classification System," American Documentation XV (January 1964): 48-52.

duce the subject headings that had been assigned to the article by a human indexer. The objective was to investigate the feasibility of a KWIC or KWOC index for the titles of the articles.

In these studies, if a word or phrase in the title matched a word or phrase in the subject heading, or if they had the same semantic root, they were considered a "match". This is similar to the kinds of "matches" used in previous studies of indexer consistency. In addition, however, the investigators included in their definition of "match" words that belonged in the same hierarchal group, and the investigators also established certain words or phrases in the titles as being synonymous or "logically equivalent" to the subject headings that had been assigned to the article. That is, these words were said to characterize concepts synonymous to the concepts characterized by the words in the subject heading. The words or phrases that had been included by the investigators in these synonymy-based categories were considered a "match" with the subject headings for which the "synonymous" or "logically equivalent" relationship had been established.

In some ways, the categories established in these studies are similar to the concept categories established for this study. This is discussed more fully, as stated above, at the end of Chapter IV.

Major Differences Between Previous Indexer Consistency Studies and the Study Reported in This Dissertation

The indexer consistency studies listed in Appendix A and the indexer consistency studies discussed in this chapter have defined indexer consistency (when it was defined) as the consistency of various degrees of replication of terminology. Only the Harris et al study departed from this.

The definitions given for "match" or replication of terminology vary from study to study and the definition is deliberately varied within some studies. This would seem to indicate that the investigators were not satisfied with the definitions of indexer consistency given in the literature and that for these studies, the concept of "match" is not the concept normally meant by the term "match". This may well reflect an unexpressed realization that these definitions were not distinguishing between degree of indexer consistency in perception of indexable matter and degree of indexer consistency in terminology.

This study defines indexer consistency as being composed of two parts:

1. Indexer consistency in the perception of indexable matter;
2. Indexer consistency in the choice of terminology with which to label the indexable matter perceived.

The purpose of the study is to demonstrate that these two parts may usefully be considered separately, that each

may be present in differing degrees, that this distinction has not been analyzed in previous studies, and that the distinction offers useful avenues of approach to indexing problems

CHAPTER III

METHODOLOGY

Introduction

Previous studies of indexer consistency have defined inter-indexer or intra-indexer consistency in terms of degrees of replication in the indexing term or terms chosen by one indexer at two or more separate points in time, or by two or more indexers working independently, to characterize the informational content of a given text or texts.

This definition of indexer consistency does not take into account the distinction made by Bernier, Lancaster, and Shaw and Rothman in their analyses of the indexing process quoted in Chapter I. These analyses distinguish between the concepts that indexers perceive as indexable matter in a given text and the term or terms that these indexers choose to characterize these concepts.

The objective of this study was to determine whether, for a given group of indexers, the extent of the degree of agreement in their perception of concepts in texts would differ from the extent of the degree of replication in the term or terms they chose to characterize the concepts they perceived.

Basic Assumptions

1. Indexing is an order-dependent technique in that a concept must be perceived before it can be expressed in an index term.

2. Perception of concepts is a process distinct from the process of choosing terms with which to characterize the concepts perceived.

Hypothesis

The degree of indexer consistency in the perception of indexable matter can be measured separately from and will be different in extent from the degree of indexer consistency in the terminology chosen to characterize that indexable matter.

Selection of Sample of Articles

Five hundred-fifty articles in the field of information science and library science were chosen as the textual material to be analyzed in this study. This sample is large enough for the results to be designated as statistically valid. It is much larger than the number of texts analyzed in previous studies.

The subject area was chosen because it is one that is familiar to the investigator and would be familiar to the people who would be employed as indexers and categorizers.

The one hundred journal articles chosen for use in the first part of this study were selected according to the following criteria.

1. They were to be a random sample chosen from the articles abstracted in Documentation Abstracts, II, No. 4 (1967).
2. Each abstract chosen represented a journal article published in English. Articles published in Proceedings were excluded.

To secure a random sample of a universe that has been or can be numbered, an appropriate series of random numbers is usually selected from a Table of Random Numbers and these numbers are then used to draw the sample from the larger universe. This was the procedure used to select the sample for this part of the study. From the 273 numbered abstracts published in Documentation Abstracts, II, No. 4 (1967), abstracts were chosen that satisfied the requirements stated in 1 and 2 above and whose last three digits corresponded to succeeding numbers in the Table of Random Numbers (8,000 Numbers) published in Arkin, Herbert and Raymond R. Colton, Tables for Statisticians (New York: Barnes and Noble, Inc., 1963) 168 p. College Outline Series No. 75, until a total of one hundred abstracts, for which it was possible to obtain the original articles from the collections of the Columbia University Libraries, the New York Public Library, and the Pratt Institute Library Service Library, had been obtained.

After completion of this part of the study, circumstances made it possible to expand the number of articles in the study universe and thus to decrease the margin of sampling

error. An additional 450 articles were added to the study universe.

These additional 450 articles represent all of the English language journal articles abstracted in Documentation Abstracts, II, Nos. 1, 2 and 3 (1967) which were available from the sources mentioned above.

Characteristics of Articles in the Study

All of the articles in the study were concerned in some way with librarianship, documentation, and information science. They ranged in type from generalized discussions with little hard, identifiable data, to articles which were little more than lists of data. They included articles on broad, inclusive subjects and also those which treated narrow topics in depth. Some of the articles were within the comprehension of the average high school student. Others were of such a complicated nature that some of the analysts had trouble in understanding them completely.

The sample of 550 articles was divided into 22 groups of 25. Each group was so chosen as to contain examples of the various types and levels of articles. Where abstracts had originally appeared with the article, they were deleted so as to prevent their content from affecting the judgement of the analysts.

Selection of Concept Analysts

The people employed in the first part of the data gathering stage of this study are called "concept analysts"

or "analysts" in the study because their task was to read the texts used in the study and analyze them for concepts.

They performed the first three steps of the indexing process as outlined by Bernier. In other words, they:

1. Selected concepts suitable for indexing;
2. Embodied the concept in a verbal paraphrase;
3. Refined the verbal paraphrase into an "embryonic index entry".

They were not asked to perform the fourth step in Bernier's analysis of the subject indexing process, that is, the translation of the "embryonic index entries" into the standardized terminology of an indexing system, although, in some cases, because of the background and training of the analysts, the terms they used are standard terms or standard terminology in the field of library and information science.

Concept analysts were chosen frcm among volunteers who were attending or had graduated from Columbia University School of Library Service or Pratt Institute Graduate School of Library and Information Science. This was done for a number of reasons.

1. The analysts could be expected to have some knowledge of and interest in the subject matter of the articles.
2. They could be expected to have some familiarity with the terminology of the field.
3. They were actual or potential users of the literature.

The work experience and educational background of the analysts was ascertained through use of a questionnaire (Appendix B). The findings of this questionnaire are displayed in Tables III-1 and III-2.

There were 34 analysts in all. Fifteen had Bachelors degrees only and were working toward a Master's degree in Library Science. Eleven were either working toward Doctoral degrees or were Advanced Study students in Library Science. Six had already received Master's degrees in other subject fields.

Only two of the analysts had not had some work experience in libraries or in library or information-oriented tasks. Twenty-four of the 34 had worked at some type of library or information-oriented task for one or more years.

No attempt was made to correlate indexer background, education, or work experience with the results of this study.

Training of Concept Analysts

The analysts were given a short (approximately 45 minutes) indoctrination session in which a set of typed instructions (Appendix C) was carefully reviewed. The analysts were also asked to analyze two articles in accordance with the instructions.

The objective of the session was to train the analysts to record the verbal labels they would ordinarily use for the concepts they perceived as indexable matter in the articles. Because <u>their</u> verbalization of <u>their</u> perceptions was the goal,

TABLE III - 1

ANALYST CHARACTERISTICS - EDUCATION

CHARACTERISTICS	NUMBER OF ANALYSTS*
Bachelor's degree only	15
Master's degree in library science	17
Master's degree in other subject	6
Doctoral degree in other subject	0
Undergraduate major	
English/English Literature	11
History	11
Psychology	4
Foreign Languages	4
Political Science	2
Asian Area Studies	2
Philosophy	1
Biology	1
Sociology	1
Arts	1
Business	1
Education	1
Graduate Study	
Library Science	34
English Literature	2
Foreign Languages	1
Art History	1
International Relations	1
History	1
Anthropology	1
Economics	1
Social Sciences	1
Religion	1

*The numbers total more than 34 because some analysts appear in more than one category.

TABLE III - 2

ANALYST CHARACTERISTICS - WORK EXPERIENCE

CHARACTERISTICS	NUMBER OF ANALYSTS*
Worked in a library or done library related work for	
Less than one year	8
One to three years	11
Four or more years	13
Never worked in a library or done library related work	2
Type of library work	
Mainly clerical tasks	11
Reference	23
Cataloging and classification	11
Administration	12
Teaching	7
Research	7
Subject analysis	3
Acquisitions	11
Automation	1
Circulation	15
Indexing	2
Abstracting	2
Worked in bookstore	1
Exhibitions	1
Bindery	1
Periodical Inventory	1
Readers Advisory Services	2
Children's Story Hours	1
Systems Analysis	1
Searching	1

*The numbers total more than 34 because some analysts appear in more than one category.

the instructions were kept in general, non-prescriptive terms except for the following.

1. A context for the analysis was given. The analysts were told to imagine they were working for an information center or library collecting materials in the area of information science, documentation, and librarianship. The size of the collection was not specified.

2. The analysts were instructed that the verbal labels they chose did not have to conform to any standardized list of terminology or to the author's words, but should be the words they would ordinarily use to describe the concepts they perceived as indexable matter. These might, of course, be the standardized verbal labels of a classification system, but they did not have to be. The analysts were not asked to produce formal index entries.

3. The analysts were asked to reflect the exact concept discussed. They were not to produce terms for a classification. They were to produce terms that accurately characterized the particular concepts they distinguished in the texts.

4. An additional facet of the study was embodied in the last paragraph of the instruction sheet. This was the possibility that an analyst might be able to indicate what concepts were discussed without being able to understand what was being said about the concept. The analysts were therefore asked to indicate their degree of comprehension of the information in the article on the bottom of the data gathering sheet.

No analysis in regard to the indicated degree of comprehension was done in respect to this study.

In addition to the instructions on the printed sheet, the analysts were all told orally to keep firmly in mind the distinction between the mere mention of an informational concept in the article and the discussion of actual information about the concept. They were only to include verbal labels for the subjects on which enough information was given to satisfy the needs of a patron wishing substantive information on the subject.

After a thorough reading and discussion of the instruction sheet, each analyst was asked to analyze two articles in the presence of the investigator. Their analyses were discussed in relation to the work that they were being asked to do. At no point were suggestions made as to what subjects should or should not have been included in their analyses. Throughout the short training sessions, the investigator stressed that what was sought was the analysts' perceptions of the content of the articles as expressed in their own verbal labels.

Data Gathering Procedure

After the short training experience described above, each analyst was then given a packet containing:

1. Copies of twenty-five of the serial articles in the sample;
2. A copy of the training instructions;

3. Twenty-five data gathering sheets (Appendix D).

They were told to analyze each article in accordance with the instructions and write the verbal labels for the concepts they identified on the data gathering sheets. When the work was completed, usually within two to four weeks, the analysts returned the completed packets to the investigator and were paid a previously agreed upon lump sum.

Each packet was analyzed by five people. The data for this study, therefore, consist of 550 x 5 analyses (550 serial articles, each analyzed five times), or 2,750 individual analyses in all.

Data Analysis Procedure

Procedure Used to Determine Consistency in Terminology

The individual verbal labels created by each analyst for each article were compared, article by article, for match in terminology, i.e., matches in entire terms, which might or might not be multi-word terms.

Definition of Consistency in Choice of Terminology

An exact match in terminology was defined as a word-for-word match. Each verbal label had to contain the same number of words, each word had to be identical in grammatical morphology (i.e., "mechanize" and "mechanization" were not considered a match) with its counterpart in the comparable

verbal label, and each word had to occupy the same position in the comparable verbal label for the verbal labels to be termed a match in terminology.

Punctuation was ignored, e.g. "Library schools curriculum" and "Library schools, curriculum" were considered a match; singular and plural forms of the same word were considered a match; abbreviations were considered a match with the words abbreviated; possessives were considered a match with the non-possessive form, e.g. "IBM Watson Library" was considered a match with "IBM's Watson Library"; and differences in capitalization and spelling were ignored, e.g. "Aeroplane" and "airplane" were considered a match in terminology.

The rather strict definition of consistency in terminology used in this study accounts, to some degree, for the low percentages recorded for consistency in terminology. When a looser definition of consistency in terminology was experimented with (a match in terminology was said to occur when the first two substantive words in the verbal labels were the same), and the formulas presented later in this chapter were used to compute the terminology consistency scores, the percentages of consistency in terminology rose. However, in the few cases in which this "loose" definition of terminology consistency was experimented with, the resulting percent of consistency in choice of terminology still never approached the percent of consistency in choice of concept. Table III - 3 displays the results of this experimentation

with the two different definitions of consistency in terminology.

TABLE III - 3

CONSISTENCY SCORES RESULTING FROM THE USE OF TWO DIFFERENT DEFINITIONS OF TERMINOLOGY CONSISTENCY

ARTICLE NUMBER	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY *	MEAN TERMINOLOGY CONSISTENCY +
1063	38.9%	0.0%	19.6%
1074	43.4%	1.5%	14.0%
1108	26.8%	0.9%	10.5%
1121	44.8%	10.8%	24.2%
1149	36.3%	6.8%	7.4%

*Defined as in this study.

+Defined as the replication of the first two words in the verbal label.

Procedure Used in Determining Concept Consistency

The individual verbal labels recorded by each analyst for each article were then examined for match in concepts. They were arranged in concept categories based on synonymy using the mathematical concept of the fuzzy set, a set in which there are continuums of grades of membership. Zadeh discusses the fuzzy set as follows.

> More often than not, the classes of objects encountered in the real physical world do not have precisely defined criteria of membership. For example, the class of animals clearly includes dogs, horses, birds, etc. as its members, and clearly excludes such objects as rocks, fluids, plants, etc. However, such objects as starfish, bacteria, etc. have an ambiguous status with respect to the class of animals. The same kind of ambiguity arises in the case of a number such as 10 in relation to the

"class" of all real numbers which are much greater than 1.

Clearly, the "class of all real numbers which are much greater than 1," or "the class of beautiful women," or "the class of tall men," do not constitute classes or sets in the usual mathematical sense of these terms. Yet, the fact remains that such imprecisely defined "classes" play an important role in human thinking, particularly in the domains of pattern recognition, communication of information, and abstraction."[1]

Zadeh defines the fuzzy set as a class "with a continuum of grades of membership"[2], and states that

> A fuzzy set provides a convenient point of departure for the construction of a conceptual framework which parallels in many respects the framework used in the case of ordinary sets, but is more general than the latter and potentially, may prove to have a much wider scope of applicability, particularly in the fields of pattern classification and information processing. Essentially, such a framework provides a natural way of dealing with problems in which the source of imprecision is the absence of sharply defined criteria of class membership rather than the presence of random variables.[3]

Thus, the concept categories established for the verbal labels produced by the analysts for each article in this study were categories hospitable to synonyms, that is,

> A word having a meaning similar to that of another word in the same language. . . . A word or expression accepted as a figurative or symbolic substitute for another word or expression.[4]

They did not have to have identity of meaning, simply synonymy.

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[1]L. A. Zadeh, "Fuzzy Sets," Information and Control VIII (1965): 338-9.

[2]Ibid.

[3]Ibid.

[4]The American Heritage Dictionary of the English Language, William Morris, ed. (New York: American Heritage Publishing Co., Inc., 1969) p. 1305.

They constituted fuzzy sets.

The process of the creation of the concept categories was essentially a subjective one. Although, for many reasons, it was necessary for the investigator to categorize the analyst verbal labels for most of the packets, it was possible, in two cases, to have the categorization of a packet done by someone other than the investigator. Therefore, although twenty of the packets were concept categorized by the investigator, two packets, one each, were concept categorized by two specially trained indexers.

This was done to determine whether the pattern of the concept consistency scores derived from the categorizations done by these indexers would differ greatly from the pattern of the scores derived from the categorizations done by the investigator.

The two categorizers were each given a copy of instructions (Appendix E) and were asked to categorize the verbal labels of two articles in the investigator's presence. They were then each given the data gathering sheets for one packet of articles and asked to categorize the verbal labels in them in accordance with the instructions.

When the verbal labels for each article in a packet had all been assigned to concept categories, the category symbols for the appropriate categories were punched on the IBM cards that had already been punched with the verbal labels. Then the verbal labels and the concept categories to which they had been assigned, were manipulated and

printed out, category by category, by computer.

Since a single verbal label often was placed in more than one concept category, the bulk of the print-out of all categories for all articles makes reproduction here unfeasible. Appendix F contains the categorized print-outs from ten of the articles.

Definition of consistency in choice of concept

Concept was defined as in Webster's New World Dictionary of the American Language, (New York: World Publishing Company, c. 1960) 302: "an idea, especially a generalized idea of a class of objects; a thought; general notion"; and as defined in The American Heritage Dictionary of the English Language, (Boston: American Heritage Publishing Company, Inc., and Houghton Mifflin Company, c. 1969) 275: "1. A general idea or understanding, especially one derived from specific instances or occurrences. 2. A thought or notion."

Although it was relatively easy to establish a definition for consistency in choice of terminology, establishing a definition for consistency in perception of concept was more difficult.

The word "concept" is defined in an abstruse, abstract, non-concrete way (witness the definitions given above). These definitions, therefore, may be accurate, but they are not precise in their expression. This was one reason why the fuzzy set was chosen as the basis for the

establishment of the concept categories in this study. It was also one of the reasons why the concept categorization was done by more than one person. The results of the comparison of the categorizations done by different categorizers are discussed in Chapter V.

It was not expected that precise replication of categorization by different investigators was likely to occur. However, the cross-test for this study indicates statistical reliability of the procedure at least sufficient for the immediate purposes of this study. Since the data are available, other investigators may test this aspect of the procedure, and the conclusions should be verifiable through replication of the experiment or only this part of it.

Computation of the Quantitative Measurements Used in the Study

Each packet of twenty-five articles was, as noted earlier, analyzed for indexable matter by five analysts. To arrive at a measure of inter-indexer consistency for every analyst in comparison with every other analyst for the packet, each analyst was paired with each of the other analysts in turn. The pairs for each packet being, therefore: Analysts 1 and 2, Analysts 1 and 3, Analysts 1 and 4, Analysts 1 and 5, Analysts 2 and 3, Analysts 2 and 4, Analysts 2 and 5, Analysts 3 and 4, Analysts 3 and 5, Analysts 4 and 5. For each packet of twenty-five articles, there were ten

pairs of analysts.

The quantitative measure used to arrive at a statement of indexer consistency for this study is based on the one described on page 117 of Saracevic and Goldwyn.[5] The formula they use is an follows:

$$\text{Indexer consistency} = \frac{\text{Number of terms in agreement}}{\text{Total Number of Unique Terms}}$$

This formula, of course, reflects the definition of indexer consistency in which no distinction is made between indexer consistency in choice of terminology and indexer consistency in perception of indexable matter or concepts.

The formulas used in the present study are directly based on the Saracevic and Goldwyn formula, but are modified to produce two separate measures of indexer consistency: consistency in choice of terminology and consistency in perception of concept.

Formula Used for Terminology Consistency Scores

The inter-indexer consistency in choice of terminology for the concept labels chosen by each pair of analysts in the group who analyzed each article for this study was calculated using the following formula.

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[5]Tefko Saracevic and A. J. Goldwyn, An Inquiry Into Testing of Information Retrieval Systems, Part I: Objectives, Methodology, Design, and Controls (Cleveland, Ohio: Case Western Reserve University Center for Documentation and Communication Research, 1968).

$$\text{Inter-Indexer Consistency In Choice of Terminology For Each Pair of Analysts} = \frac{\text{Number of Verbal Labels Chosen by Both Analysts That Had Matching Terminology}}{\text{Number of Unique Verbal Labels Chosen by Both Analysts}}$$

Then the arithmetic mean of the sum of the Consistency in Terminology Scores of all pairs of analysts was calculated and this became the stated measure of inter-analyst (inter-indexer) consistency in choice of terminology for the article. Appendix G contains examples of the tables derived from the use of this formula and of the formula which follows.

Formula Used for Concept Consistency Scores

The inter-indexer consistency in identification of concepts for each article for each pair of analysts were computed on the basis of the following formula, a modification of the formula used for computation of inter-indexer consistency in choice of terminology.

$$\text{Inter-Indexer Consistency in Choice of Concept for Each Pair of Analysts} = \frac{\text{Number of Synonymous Concepts Chosen by Both Analysts}}{\text{Total Number of Unique Concepts Chosen by Both Analysts}}$$

Then the arithmetic mean of the sum of the consistency in choice of concept of all the pairs was calculated and this became the stated measure of inter-indexer consistency in choice of concept for the article.

Percentages in both sets of calculations were computed to the second place to the right of the decimal point and rounded to the first.

The two measures of consistency were then compared to test the hypothesis.

Availability of Raw Data for Use by Other Investigators

The methodology, raw data, and findings for this investigation will be available from the investigator for a period of five years after its publication. Interested researchers may use this material either for their own purposes or to investigate the methodology and findings of this study itself.

The study was designed to be replicable. In addition, cross checks between packets of articles, all of which contained different articles and were analyzed by different combinations of indexers, reveal a pattern of results indicating that the differences found were of a gross nature and that a higher degree of precision in the definitions used (although desirable) was not a requirement for the determination of meaningful conclusions. It is to be hoped that the study itself may lead to means for the greater refinement of techniques for studies of this kind.

CHAPTER IV

CONCEPT CATEGORIZATION

Physical Format Used to Display Analysts' Verbal Labels

Below is a reproduction of the computer print-out of one of the verbal labels assigned by one of the analysts to the subject content of one of the articles in this study. All of the analyst labels were organized in this manner.

11 1075 OCA SALARIES FOR BEGINNING INFORMATION SCIENTISTS

The print-out is divided into four fields. The first field contains the analyst's identification number. The next contains the article identification number. The third field contains the alphabetic symbols for the concept categories assigned to this verbal label. The last field contains the actual words in the verbal label created by the analyst. In other words, this verbal label, SALARIES FOR BEGINNING INFORMATION SCIENTISTS, was created by analyst 11 for article 1075 and was seen by the categorizer to contain concepts from categories O, C, and A (BEGINNING; SALARIES; AND INFORMATION SCIENTISTS). In the

complete categorization of the verbal labels for this article, the verbal label itself is printed under each of the three categories.

Basis for the Establishment of Concept Categories

All of the verbal labels assigned to the articles by the five analysts were categorized in a similar manner. The generalized context of the categorization was conceived of as a type of coordinate index. Each of the articles was categorized without relation to the categories previously established for any other articles. Each verbal label was scanned individually, reduced to what were perceived as separate concepts and categorized according to these concepts.

It is apparent that the categorizers' perception and identification of the concepts chosen by the analysts was subjective. However, the goal was to isolate "every" concept in every label. These concepts were then assigned names, and each name represented one concept category. At no time did the categorizers read or refer to the actual article analyzed.

Example and Explanation of the Categorization Process as Exhibited in the Analysis of the Analyst's Verbal Labels for a Particular Article

The particular article to which the previously reproduced analyst verbal label was assigned is: Theodore

C. Hines, "Salaries and Academic Training Programs for Information Scientists." Journal of Chemical Documentation VII (May 1967): 118-20. The categorization of the verbal labels assigned by the analysts to the subject content of this article was quite straightforward.

A step-by-step explanation of the method used in assigning concept categories to the verbal labels created for the article by the analysts is given on the next few pages. The categorization in its entirety is displayed following the explanation.

All of the verbal labels created by the five analysts for article 1075 were keypunched individually on IBM cards exactly as written by the analysts. They were then printed out by computer, analyst by analyst. This print-out was read by the categorizer for the purpose of assigning concept categories.

The first verbal label on the print-out for article 1075 was INFORMATION SCIENTISTS - TRAINING. The categorizer perceived this label as containing the concepts INFORMATION SCIENTISTS and TRAINING. These concepts were therefore arbitrarily assigned the category labels 1075A INFORMATION SCIENTISTS and 1075B TRAINING. The other verbal labels created for this article were then scanned. If any of them contained the concept INFORMATION SCIENTIST, category A was assigned to that label. If it did not contain the concept INFORMATION SCIENTIST, the category A

was not assigned to it. The actual words "Information scientist" did not have to appear in the verbal label for it to be assigned category A. For instance, the verbal label PERSONNEL, INFO. SCI. was assigned to category 1075A. Likewise, the verbal label LIBRARY SCHOOLS - CURRICULUM FOR INFORMATION SCIENCE was assigned to category 1075B even though the actual word "training" does not appear in the label. When all of the verbal labels that contained the concepts INFORMATION SCIENTISTS and TRAINING had been assigned the proper alphabetic symbol, the second verbal label on the print-out was read. Let us suppose that this second verbal label was INFORMATION SCIENTISTS - SALARIES. The concept INFORMATION SCIENTISTS had already received a category label and alphabetic symbol. It was therefore not considered again. The only new concept in this verbal label is SALARIES. The concept category 1075C SALARIES was therefore established and each succeeding verbal label on the print-out was scanned for the concept SALARIES. When a verbal label was found to contain the concept SALARIES, it was assigned the category symbol C.

This procedure was continued until all the concepts contained in all the verbal labels created for article 1075 had been assigned symbols and each verbal label had been searched for each concept.

The alphabetic symbols assigned to each verbal label were then keypunched on the IBM card already punched with the verbal label. These cards and a categorization

program deck of cards were then put through the computer and the resulting print-out listed category labels for each article and the verbal labels assigned to each category on the succeeding pages.

The alphabetic (or in some cases punctuation mark) symbols assigned to differentiate the categories from one another do not indicate any relationship between the concepts established for a single article or between the concepts established for different articles. They were simply assigned one after the other in no particular meaningful way, beginning arbitrarily with the letter A for the first concept identified in a particular article's verbal labels. The order in which the concept category labels were assigned alphabetical symbols was influenced only by the order of the verbal labels in the print-out, and although the verbal labels for each article were grouped by analyst, the order in which the verbal labels appeared in each analyst-grouping was dictated only by the order in which the verbal labels had been keypunched.

PRINT-OUT OF CATEGORIZATION OF ARTICLE NO. 1075

A. INFORMATION SCIENTISTS

6	1075	BA	INFORMATION SCIENTISTS-TRAINING
6	1075	CA	INFORMATION SCIENTISTS-SALARIES
6	1075	DA	INFORMATION SCIENTISTS-AVAILABILITY (I.E. NUMBER)
6	1075	GBA	LIBRARY SCHOOLS-TRAINING OF INFORMATION SCIENTISTS
6	1075	HCA	INFORMATION SCIENTISTS-ADVANCED POSITIONS-SALARIES
6	1075	IA	INFORMATION SCIENTISTS-RECRUITMENT
6	1075	JCA	INFORMATION SCIENTISTS-SALARIES-COMPARED TO CHEMISTS' SALARIES

5	1075	IA	RECRUITMENT-INFORMATION SCIENTISTS
5	1075	NBA	SCIENCE TRAINING REQUIREMENT-INFORMATION SCIENTISTS
11	1075	OCA	SALARIES FOR BEGINNING INFORMATION SCIENTISTS
11	1075	KBA	ACADEMIC TRAINING PROGRAMS FOR INFORMATION SCIENTISTS
11	1075	IA	RECRUITING INFORMATION SCIENTISTS
2	1075	A	PERSONNEL, INFO. SCI.
13	1075	KBA	INFORMATION SCIENTISTS, ACADEMIC TRAINING PROGRAMS

B. TRAINING

6	1075	BA	INFORMATION SCIENTISTS-TRAINING
6	1075	GBAK	LIBRARY SCHOOLS-TRAINING OF INFORMATION SCIENTISTS
5	1075	KFB	INFORMATION SCIENCE-ACADEMIC TRAINING PROGRAMS
5	1075	KGFB	LIBRARY SCHOOLS-CURRICULUM FOR INFORMATION SCIENCE
5	1075	NBA	SCIENCE TRAINING REQUIREMENT-INFORMATION SCIENTISTS
11	1075	KBA	ACADEMIC TRAINING PROGRAMS FOR INFORMATION SCIENTISTS
2	1075	B	TRAINING
13	1075	KBA	INFORMATION SCIENTISTS, ACADEMIC TRAINING PROGRAMS
13	1075	ZKGFB	LIBRARY SCHOOLS OFFERING INFORMATION SCIENCE COURSES IN 1966

C. SALARIES

6	1075	CA	INFORMATION SCIENTISTS-SALARIES
6	1075	HCA	INFORMATION SCIENTISTS-ADVANCED POSITIONS-SALARIES
6	1075	JCA	INFORMATION SCIENTISTS-SALARIES-COMPARED TO CHEMISTS' SALARIES
5	1075	FC	INFORMATION SCIENCE-SALARIES
11	1075	OCA	SALARIES FOR BEGINNING INFORMATION SCIENTISTS
2	1075	C	SALARIES
13	1075	FC	INFORMATION SCIENCE, SALARIES IN

D. NUMBER OF INFORMATION SCIENTISTS AVAILABLE; PROFESSIONAL PERSONNEL POOL

6	1075	DA	INFORMATION SCIENTISTS-AVAILABILITY (I.E. NUMBER)
11	1075	D	PROFESSIONAL PERSONNEL SHORTAGES

E. STUDENT SUPPORT; FINANCIAL AID; SCHOLARSHIPS

6	1075	FE	INFORMATION SCIENCE STUDENTS-SUPPORT
5	1075	GE	LIBRARY SCHOOLS-STUDENT AID
11	1075	FE	LEVEL OF SUPPORT FOR INFORMATION SCIENCE STUDENTS
2	1075	E	SCHOLARSHIPS
13	1075	FE	INFORMATION SCIENCE, FELLOWSHIPS

F. INFORMATION SCIENCE

6	1075	FE	INFORMATION SCIENCE STUDENTS-SUPPORT
5	1075	FC	INFORMATION SCIENCE-SALARIES
5	1075	KFB	INFORMATION SCIENCE-ACADEMIC TRAINING PROGRAMS
5	1075	KGFB	LIBRARY SCHOOLS-CURRICULUM FOR INFORMATION SCIENCE
11	1075	FE	LEVEL OF SUPPORT FOR INFORMATION SCIENCE STUDENTS
2	1075	F	INFO. SCI.
13	1075	FC	INFORMATION SCIENCE, SALARIES IN
13	1075	ZKGFB	LIBRARY SCHOOLS OFFERING INFORMATION SCIENCE COURSES IN 1966
13	1075	FE	INFORMATION SCIENCE, FELLOWSHIPS

G. LIBRARY SCHOOLS

6	1075	GBAK	LIBRARY SCHOOLS-TRAINING OF INFORMATION SCIENTISTS
5	1075	LG	LIBRARY SCHOOLS-ADMISSION REQUIREMENTS
5	1075	MG	LIBRARY SCHOOLS-FINANCIAL SUPPORT
5	1075	GE	LIBRARY SCHOOLS-STUDENT AID
5	1075	KGFB	LIBRARY SCHOOLS-CURRICULUM FOR INFORMATION SCIENCE
2	1075	G	LIBRARY SCHOOLS
13	1075	ZKGFB	LIBRARY SCHOOLS OFFERING INFORMATION SCIENCE COURSES IN 1966

H. ADVANCED POSITIONS

6	1075	HCA	INFORMATION SCIENTISTS-ADVANCED POSITIONS-SALARIES

I. RECRUITMENT

6	1075	IA	INFORMATION SCIENTISTS-RECRUITMENT
5	1075	IA	RECRUITMENT-INFORMATION SCIENTISTS
11	1075	IA	RECRUITING INFORMATION SCIENTISTS
2	1075	I	RECRUITING

J. CHEMISTS

6	1075	JCA	INFORMATION SCIENTISTS-SALARIES-COMPARED TO CHEMISTS' SALARIES

K. ACADEMIC TRAINING PROGRAMS; CURRICULUM

6	1075	GBAK	LIBRARY SCHOOLS-TRAINING OF INFORMATION SCIENTISTS
5	1075	KFB	INFORMATION SCIENCE-ACADEMIC TRAINING PROGRAMS
5	1075	KGFB	LIBRARY SCHOOLS-CURRICULUM FOR INFORMATION SCIENCE
11	1075	KBA	ACADEMIC TRAINING PROGRAMS FOR INFORMATION SCIENTISTS
2	1075	K	CURRICULUM
13	1075	KBA	INFORMATION SCIENTISTS, ACADEMIC TRAINING PROGRAMS
13	1075	ZKGFB	LIBRARY SCHOOLS OFFERING INFORMATION SCIENCE COURSES IN 1966

L. ADMISSION REQUIREMENTS

5	1075	LG	LIBRARY SCHOOLS-ADMISSION REQUIREMENTS

M. FINANCIAL SUPPORT OF LIBRARY SCHOOLS

5	1075	MG	LIBRARY SCHOOLS-FINANCIAL SUPPORT

N. TRAINING IN SCIENCE

5	1075	NBA	SCIENCE TRAINING REQUIREMENT-INFORMATION SCIENTISTS

O. BEGINNING POSITIONS

11	1075	OCA	SALARIES FOR BEGINNING INFORMATION SCIENTISTS

P. COSATI REPORT

2	1075	P	COSATI REPORT

Q. CHEMICAL AND ENGINEERING NEWS
2 1075 Q CHEMICAL & ENGINEERING NEWS

R. CHEMISTRY
2 1075 R CHEMISTRY

S. WOMEN
2 1075 S WOMEN

T. NATIONAL RESEARCH CENTER
2 1075 T NAT. RESEARCH CENTER

U. HIGHER EDUCATION ACT
2 1075 U HIGHER ED. ACT

V. AMERICAN DOCUMENTATION
2 1075 V AMER. DOCUMENTATION

W. STATISTICS
2 1075 W STATISTICS

X. INDUSTRY
2 1075 X INDUSTRY

Y. CHEMICAL ABSTRACTS
2 1075 Y CHEMICAL ABSTRACTS

Z. 1966
13 1075 ZKGFB LIBRARY SCHOOLS OFFERING INFORMATION SCIENCE COURSES IN 1966

Concept categories 1075 A, B, C, E, F, and K were all chosen by all five analysts. That is, all the analysts created verbal labels that embodied the concepts INFORMATION SCIENTISTS, TRAINING, SALARIES, STUDENT FINANCIAL AID, INFORMATION SCIENCE, ACADEMIC TRAINING PROGRAMS. This article was obviously about the salaries and academic training of information scientists.

Category G, LIBRARY SCHOOLS, was identified as a subject concept by four of the analysts, as was Category I, RECRUITMENT.

In addition to the above concept categories, however, a number of other subject concepts were identified by one or more of the analysts. These included Categories D, THE NUMBER OF INFORMATION SCIENTISTS AVAILABLE; J, CHEMISTS; L, ADMISSION REQUIREMENTS; etc. The concepts identified by less than four of the five analysts probably represent peripheral areas touched on by the author. Obviously, some analysts believed indexable information on them was contained in the article -- some did not. The analysts' perception of concepts as indexable or non-indexable matter varied. What was of prime interest for this study, of course, was whether they varied to a greater or lesser extent than the terminology used by each analyst to describe the concepts he chose to record. The statistics on the percent of indexer consistency in choice of concept and in choice of terminology for article 1075 are presented in Table IV - 1.

Inter-indexer consistency in perception of concept for each pair of analysts ranged from a low of 35.0% to a high of 66.6%. The mean concept consistency for all pairs of analysts was 49.6%. None of the verbal labels created by the analysts matched those of any other analyst. Terminology consistency was therefore 0.0%.

As stated before, all the analysts created verbal labels that embodied the concepts INFORMATION SCIENTISTS, TRAINING, SALARIES, STUDENT FINANCIAL AID, INFORMATION SCIENCE, and ACADEMIC TRAINING PROGRAMS. The title of the

TABLE IV - 1

PERCENTAGES OF INTER-ANALYST CONSISTENCY IN CHOICE OF CONCEPTS AND IN CHOICE OF TERMINOLOGY FOR ARTICLE 1075

PAIRS OF ANALYSTS	CONCEPT CONSIS-TENCY	TERMIN-OLOGY CONSIS-TENCY	ARITHMETIC MEAN OF CONCEPT CON-SISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
6 and 5	57.1%	0.0%		
6 and 11	66.7%	0.0%		
6 and 2	38.1%	0.0%		
6 and 13	58.3%	0.0%		
5 and 11	53.8%	0.0%		
5 and 2	38.1%	0.0%		
5 and 13	58.3%	0.0%		
11 and 2	35.0%	0.0%		
11 and 13	54.5%	0.0%		
2 and 13	36.8%	0.0%	49.7%	0.0%

article: "Salaries and Academic Training Programs for Information Scientists", contains all but one of these concepts and a KWIC index of the title would provide many appropriate words as access points.

At least four of the five analysts also created verbal labels for the concepts LIBRARY SCHOOLS and RECRUITMENT. These access points do not occur in the title. The degree of influence exerted by the title on the analysts' choice of concepts has not been investigated for this study, but might prove a worthwhile area to explore. There have been studies that compare indexers choice of terms for a given text with the words chosen from the title of the text for a KWIC or a KWOC index.

In a concept category like 1075I, RECRUITMENT, the four verbal labels listed could be regularized for terminology easily by human manipulation, or even by a computer program using semantic or morphological rules for standardization. These verbal labels were:

6	1075	IA	INFORMATION SCIENTISTS-RECRUITMENT
5	1075	IA	RECRUITMENT-INFORMATION SCIENTISTS
11	1075	IA	RECRUITING INFORMATION SCIENTISTS
2	1075	I	RECRUITING

As they stand now, they are not a match in terminology.

Categories 1075B, TRAINING and 1075K, ACADEMIC TRAINING PROGRAMS, might have been combined into one concept category except for the verbal label TRAINING created by analyst 2. There are other kinds of training besides academic training, a fact analyst 2 was surely aware of.

However, in the end result, we only have access to the terms the indexer actually recorded, therefore his use of the word by itself must be assumed to reflect his perception of the concept he believed was embodied in the article. To assume that he meant academic training would be to augment his verbal label. Therefore this was not done and two categories had to be established to encompass the two concepts. The fact that analyst 2 also chose the verbal label CURRICULUM, a word that refers to academic training, and was therefore included under category 1075K, does not alter this.

Types of Concept Categories

In the categorization of article 1075 on the previous pages and in the print-out of article categorizations in Appendix F, some of the concept categories can be seen to contain two or more concepts or a concept and a modifier. These categories were established because the categorizer felt that a multiple concept category would be more useful for the particular article than establishing two separate categories.

There were also articles in which a separate category for a single concept was established and a multiple concept category was also established that included the separate concept, e.g. LIBRARIES; PUBLIC LIBRARIES; URBAN PUBLIC LIBRARIES.

Some categories contain only a concept that may be referred to as a standard modifier or subdivision (a concept which has the ability to narrow and/or modify the scope of another concept, i.e., ADVANTAGES; METHODS). The cases in which these were established as separate categories were cases in which the categorizer perceived them as the focus of the analysts' labels, i.e. when it seemed that METHODOLOGY or EVALUATION was the central concern. Standard modifiers were established as separate categories also in cases where, within a single article, many different categories would have contained different standard modifiers or repeated a single standard modifier.

In articles where these standard modifiers formed part of a multiple concept category, it was the categorizers' judgement that this was the most appropriate way to treat the concept(s) and that, in a sense, the multiple concept category established was similar to a bound term, i.e. NEWARK CHARGING SYSTEM, ADVANTAGES; not NEWARK CHARGING SYSTEM and ADVANTAGES.

For the purposes of the categorization, names of organizations, journals, etc., were treated as single concepts and not broken into the concepts ordinarily signified by the individual words in their titles, e.g., the verbal label CHEMICAL ABSTRACTS which refers to the title of a journal, appears under the category 1075Y, CHEMICAL ABSTRACTS, but not under category 1075R, CHEMISTRY.

After the categorization process was completed, the formulas described in Chapter III were used to analyze the data.

Analysts' Verbal Labels

Although most of the analysts usually employed verbal labels containing two or more words, some seldom used more than two words for a verbal label unless the label were the name of an organization, publication, or similar previously established multi-word grouping. However, it was noted that those analysts whose individual verbal labels contained few words created a greater number of individual verbal labels for a given article. Examples of this are displayed in Table IV - 2. Analyst GK, who created a relatively large number of verbal labels for each article, consistently used only one or two words per label. Other analysts created fewer labels for each article, but used more words per label.

TABLE IV - 2

NUMBER OF VERBAL LABELS PER ARTICLE IN COMPARISON TO NUMBER OF WORDS PER VERBAL LABEL

ARTICLE NUMBER	ANALYST	NUMBER OF VERBAL LABELS	AVERAGE NUMBER OF WORDS PER LABEL
1127	GK	10	1.7
	EP	4	6.5
	LB	8	4.8
	BC	3	7.6
	JY	4	3.2
1116	GK	9	1.8
	EP	4	5.5
	LB	4	6.7
	BC	7	4.1
	JY	7	2.4
1089	GK	15	1.9
	EP	5	7.4
	LB	1	7.0
	BC	6	6.7
	JY	2	7.0
1068	GK	17	1.8
	EP	1	7.0
	LB	1	8.0
	BC	6	4.5
	JY	9	5.2

Categorizers' Evaluation of Analysts' Verbal Labels

The categorizers attempted to evaluate the analysts verbal labels exactly as written. This is the reasoning behind category 1075M, FINANCIAL SUPPORT OF LIBRARY SCHOOLS. Analyst 5 wrote the verbal label LIBRARY SCHOOLS - FINANCIAL SUPPORT. Although one might suppose from other analysts' labels for article 1075 that she meant financial support of students, she had written a label consistent with the concept of financial support of library schools. She also had written the label LIBRARY SCHOOLS - STUDENT AID. This does not exclude the possibility that the first-mentioned label meant support of students since many analysts wrote more than one label encompassing the same concepts. A perusal of the article itself would have solved this problem since the categorizer could have ascertained whether or not the author had included information on the financial support of library schools. The point of this study, however, is to categorize the analysts' perceptions as recorded in the verbal labels they created. Therefore the verbal label was taken at face value and a separate category was created for it.

In cases similar to the above, where the categorizer had doubts about the actual meaning of a word in a label, a standard dictionary was used to provide definitions.

The use of a dictionary in establishing concept categories was of real importance in cases where words are customarily used imprecisely. It is, of course, reasonable

to suppose that the analysts themselves were not always careful in their use of overlapping or ambiguous words. A case in point is use of the terms "automation", "mechanization", and "computerization". The dictionary defines automation as the automatic operation or control of machines or processes; and mechanization as the use or introduction of machines into processes, but also, as the process of making something automatic. These words have great overlap in meaning and, in most of the categorizations in this study, were used as empirically synonymous. The word "computerization" was distinguished from automation or mechanization since it was perceived as referring only to the use or introduction of computers. The fuzzy set bearing the name "automation" or "mechanization" might include computerization, but it might not. "Computerization" would always include the concept of mechanization. (To use a device which is primarily electronic, not mechanical, is still to "mechanize".)

There are certain types of analyst verbal labels that name their own concepts. For instance, CARLOS CUADRA remains Carlos Cuadra in name and in concept. Although philosophers may argue that CARLOS CUADRA, 1947 is not CARLOS CUADRA, 1967; the concept CARLOS CUADRA names itself in a concept categorization.

This is true of other kinds of names. Names of organizations, for example, like the International Union of

Pure and Applied Chemistry; names of places, like Canada; names of things, like books.

The categories established for this study are concept categories. In many cases, the categories may appear to be word-based, rather than concept-based, because the actual words in the analyst verbal labels match the words in the category name. When this has occurred, it is because it is an instance in which the concept named itself.

Hierarchal Expansion in Verbal Labels

In addition to the problems encountered in the concept categorization, a reading of the verbal labels created by the analysts for some of the articles reveals certain problems which affected the outcome of this study that each analyst had to resolve for himself. One of the major problems was caused by the lack of guidelines as to desired hierarchal treatment.

It is apparent from some of the verbal labels that for some articles, some of the analysts decided to classify concepts, that is, to group them under a generically higher, inclusive "class" term, rather than to list each concept separately at a lower generic level. For example, in an article on the work of the committees of the Special Libraries Association, some of the analysts listed each committee, others classed the information under the verbal label SPECIAL LIBRARIES ASSOCIATION, COMMITTEES.

It is not now possible to discover what their reasoning was on this point, and it was not the intent of this study to do so. There are many possible reasons ranging from a desire to complete the work quickly to the possibility that the concept they perceived was the class concept, to the possibility that they may have felt that the generically higher (class) term was the more useful in the context of the analysis.

This problem of choice of higher generic terms in contrast to lower generic terms is apparent in the analysis of articles 1151 and 1233.

In 1151, all the analysts chose the concept NEW ENGLAND STATE UNIVERSITIES' LIBRARIES. Each analyst had to make an individual decision as to whether the name of each separate university should also be identified as a subject concept. Only one of them chose to do so. This analyst identified six universities by name and also chose to use the verbal label ACADEMIC LIBRARIES. This had an effect on the consistency statistics for this article. Table IV - 3 contains the statistics on consistency for the article as it was analyzed and categorized. Table IV - 4 contains the statistics on consistency that would have resulted if analyst 11 had chosen <u>not</u> to create verbal labels for the names of the six universities and ACADEMIC LIBRARIES.

Of course, the terminology consistency changes very little in the following two tables since only one analyst chose the universities' names and the label ACADEMIC LIBRARIES.

TABLE IV - 3

PERCENTAGES OF INTER-INDEXER CONSISTENCY IN CHOICE OF CONCEPTS AND IN CHOICE OF TERMINOLOGY FOR ARTICLE NO. 1151

PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
6 and 5	35.7%	0.0%		
6 and 11	18.2%	0.0%		
6 and 2	18.2%	0.0%		
6 and 13	33.3%	9.1%		
5 and 11	21.1%	0.0%		
5 and 2	15.0%	0.0%		
5 and 13	54.5%	0.0%		
11 and 2	25.0%	3.7%		
11 and 13	26.3%	0.0%		
2 and 13	20.0%	0.0%	26.7%	1.3%

TABLE IV - 4
PERCENTAGES OF INTER-INDEXER CONSISTENCY IN CHOICE OF CONCEPT AND IN CHOICE OF TERMINOLOGY FOR ARTICLE NO. 1151 WITH MODIFICATION OF ANALYST 11
VERBAL LABELS

PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
6 and 5	35.7%	0.0%		
6 and 11	26.8%	0.0%		
6 and 2	18.2%	0.0%		
6 and 13	33.3%	9.1%		
5 and 11	33.3%	0.0%		
5 and 2	15.0%	0.0%		
5 and 13	54.5%	0.0%		
11 and 2	27.5%	4.5%		
11 and 13	50.0%	0.0%		
2 and 13	20.0%	0.0%	31.4%	1.4%

The mean of the concept consistency for the article is changed to a greater degree.

This same problem arose in connection with the analyst verbal labels for article 1233, but in this case, both the concept consistency percentage and the terminology consistency percentage would be changed appreciably if some of the analysts chose <u>not</u> to use narrow as well as broad concepts.

All of the analysts had chosen the subject concept LINGUISTICS for article 1233. The problem the analysts faced was whether or not the individual languages discussed in the article should be identified as subject concepts. The particular categories and analyst verbal labels involved are as follows.

PART OF CATEGORIZATION OF ARTICLE NO. 1233

B.	LINGUISTICS			
	6	1233	CBA	BIBLIOGRAPHIC CONTROL OF LINGUISTIC SCHOLARSHIP
	5	1233	EDB	LINGUISTIC BIBLIOGRAPHY-INDO-EUROPEAN LANGUAGES
	5	1233	TEB	LINGUISTIC BIBLIOGRAPHY-BIBLIOGRAPHIC ESSAY
	5	1233	VB	LINGUISTICS-ABSTRACTING SERVICES
	5	1233	YWB	LINGUISTICS-SUBJECT INDEXES
	5	1233	?YXB	LINGUISTICS-COMPUTERIZED INDEXES
	5	1233	YB	LINGUISTICS-CUMULATIVE INDEXES
	11	1233	DCBA	BIBLIOGRAPHIC CONTROL OF LINGUISTIC SCHOLARSHIP IN INDO-EUROPEAN LANGUAGES
	2	1233	B	LINGUISTICS
	2	1233	:B	HISTORY OF LANGUAGE

	13	1233	EB	BIBLIOGRAPHY, LINGUISTIC
	13	1233	?EB	COMPUTER RETRIEVAL, PROPOSED FOR LINGUISTIC BIBLIOGRAPHY
D.	INDO-EUROPEAN			
	6	1233	ED	INDO-EUROPEAN LANGUAGES-BIBLIOGRAPHY
	5	1233	EDB	LINGUISTIC BIBLIOGRAPHY-INDO-EUROPEAN LANGUAGES
	11	1233	DCBA	BIBLIOGRAPHICAL CONTROL OF LINGUISTIC SCHOLARSHIP IN INDO-EUROPEAN LANGUAGES
	2	1233	D	INDO-EUROPEAN LANGUAGES
H.	GREEK			
	6	1233	HGE	CLASSICAL GREEK-BIBLIOG.
	6	1233	JIHGE	CLASSICAL STUDIES (GREEK & ROMAN)-BIBLIOG.-DOCTORAL DISSERTATIONS
	2	1233	H	GREEK LANGUAGE
I.	LATIN; ROMAN			
	6	1233	IE	LATIN-BIBLIOG.
	6	1233	JIHGE	CLASSICAL STUDIES (GREEK & ROMAN)-BIBLIOG.-DOCTORAL DISSERTATIONS
	2	1233	I	LATIN LANGUAGE
M.	GERMANIC			
	6	1233	ME	GERMANIC LANGUAGES-BIBLIOG.
	2	1233	M	GERMANIC LANGUAGES
	13	1233	ME	GERMANIC LANGUAGES, BIBLIOGRAPHY
N.	SCANDINAVIAN			
	6	1233	NE	SCANDINAVIAN LANGUAGES-BIBLIOG.
	2	1233	N	SCANDINAVIAN LANGUAGES
	13	1233	NE	SCANDINAVIAN LANGUAGES, BIBLIOGRAPHY
O.	ENGLISH			
	6	1233	OE	ENGLISH LANGUAGE-BIBLIOG.
	13	1233	OE	ENGLISH LANGUAGE, BIBLIOGRAPHY

P.	ROMANCE LANGUAGES			
	6	1233	PE	ROMANCE LANGUAGES-BIBLIOG.
	2	1233	P	ROMANCE LANGUAGES
	13	1233	PE	ROMANCE LANGUAGES, BIBLIOGRAPHY
Q.	CELTIC			
	6	1233	QE	CELTIC LANGUAGES-BIBLIOG.
	2	1233	Q	CELTIC LANGUAGES
	13	1233	QE	CELTIC LANGUAGES, BIBLIOGRAPHY
R.	SLAVIC			
	6	1233	RE	SLAVIC LANGUAGES-BIBLIOG.
	2	1233	R	SLAVIC LANGUAGES
	13	1233	RE	SLAVIC LANGUAGES, BIBLIOGRAPHY
S.	INDIAN			
	6	1233	SE	INDIAN (EAST) LANGUAGES-BIBLIOG.
	2	1233	S	INDIAN LANGUAGES

As can be seen, although all analysts chose verbal labels that could be categorized as containing the concept LINGUISTICS, the analysts varied in their perception of individual languages or families of languages as subject concepts. Four chose concepts contained in category 1233D, INDO-EUROPEAN; three chose concepts contained in categories 1233M, GERMANIC; 1233N, SCANDINAVIAN; 1233P, ROMANCE; 1233Q, CELTIC; 1233R, SLAVIC; and two chose concepts contained in categories 1233H, GREEK; 1233I, LATIN; ROMAN; 12330, ENGLISH; and 1233S, INDIAN.

Some of the verbal labels in the above categories matched in terminology as well as in concept. In the case of article 1233, therefore, both the concept consistency and

TABLE IV - 5

PERCENTAGES OF INTER-INDEXER CONSISTENCY IN CHOICE OF CONCEPT AND IN CHOICE OF TERMINOLOGY FOR ARTICLE NO. 1233

PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
6 and 5	17.9%	4.2%		
6 and 11	38.1%	5.3%		
6 and 2	56.5%	4.8%		
6 and 13	50.0%	35.0%		
5 and 11	33.3%	7.1%		
5 and 2	29.2%	6.2%		
5 and 13	16.7%	4.8%		
11 and 2	28.6%	9.1%		
11 and 13	26.3%	6.2%		
2 and 13	40.9%	5.5%	33.8%	8.8%

TABLE IV - 6

PERCENTAGES OF INTER-INDEXER CONSISTENCY IN CHOICE OF CONCEPT AND IN CHOICE OF TERMINOLOGY FOR ARTICLE NO. 1233 WITH MODIFICATION OF VERBAL LABELS

PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
6 and 5	26.5%	4.2%		
6 and 11	66.6%	11.1%		
6 and 2	35.5%	4.8%		
6 and 13	38.5%	12.6%		
5 and 11	33.3%	7.1%		
5 and 2	43.4%	6.2%		
5 and 13	22.2%	4.8%		
11 and 2	46.2%	9.1%		
11 and 13	38.5%	13.4%		
2 and 13	30.8%	5.5%	38.1%	7.9%

the terminology consistency were affected by the analysts' choice of broad or narrow terms.

Table IV - 5 contains the statistical results for the article as it was actually analyzed and categorized. Table IV - 6 contains the statistics that would have resulted if the analysts had chosen not to create labels for the names of the individual languages.

Problems of Classification and Indexing as Reflected in the Verbal Labels

The problem involved in choice of higher or lower generic concepts as in article 1233, just discussed, is comparable to a problem apparent in the analysis of some of the other articles. This problem may imprecisely be called the difference between classification and indexing. This does not mean the difference between levels of indexing (often referred to as indexing specificity) and classification. "Classification is, in its simplest statement, the putting together of similar things, or, more fully described, it is the arranging of things according to likeness and unlikeness."[1]

In classification, a group of items with characteristics that could be more precisely defined, are assigned to

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[1]Margaret Mann, Introduction to Cataloging and the Classification of Books, 2nd ed. (Chicago: American Library Association, 1943), p. 33.

more general categories. When an item is assigned to a class of items, it is an indication that there is a relationship between the individual item and the other items in the group.

Indexing is the characterization of various concepts in an item, or the item itself as a whole, so as to distinguish the concept or item from a mass of similar concepts or items and thus provide access to the concept or item. The various levels of indexing refer to the narrowness or broadness of the concepts to be characterized. If we are to assign five terms per item indexed, concepts will necessarily be broader (more inclusive) than if we are to assign twenty terms per item indexed. It may be that none of these index terms will characterize the item with a term that groups it with similar items in a way analagous to the groupings of a classification system.

An example of this kind of problem may be found in the analysis of article 1085.

Article 1085 is a collection of brief reports of various special representatives of the Special Libraries Association. In the analysis of this article, analyst 4 created only two verbal labels:

4 1085 #CB SPECIAL LIBRARIES ASSN., SPECIAL REPRESENTATIVES' REPORTS, 1966-67

4 1085 #CB1 SPECIAL LIBRARIES, PROGRESS IN THE FIELD, SHORT REPORTS SLA, 1966-67

These were analagous to a classification of the content of the article. The other analysts created verbal labels for

the reports and for the subjects touched on by the reports and thereby created many more verbal labels than analyst 4, labels analagous to index entries.

These two approaches seem to reflect a difference in the analysts' perception of the usefulness of two different levels of concepts, one of which subsumes the other.

In article 1085, the hierarchic relationship between levels of verbal labels is not a permanent relationship. The reports and the concepts reported on could exist separately from the Special Libraries Association. The relationship is a relationship established within the context of the article and the context of the Special Libraries Association.

In article 1233, there is a permanent relationship between the concepts that is not dependent on their concatenation in the context of the article. The concept of LINGUISTICS and the concept of the various languages are related and do not exist in a non-related form.

Other Studies of Indexing Methodology in Which Categories Based on Synonymy Were Established

The concept categorization process for this study, which is based on synonymy and the fuzzy set, can be related to the categorization process used in other indexing studies (not indexer consistency studies) in which the objective was to establish categories based on synonymy.

Although this study does not attempt to use the concept categorizations established for it in any way

similar to the way that Montgomery and Swanson use the categories they established for their study of the feasibility of automatic assignment of subject headings from titles for articles cited in the Index Medicus[2], it is relevant to compare them.

Montgomery and Swanson wanted to establish the extent to which the article titles in their sample contained words which were "identical to - or near synonyms of - the subject headings (usually one word) under which the title appear(ed)"[3] in the Index Medicus.

They therefore established categories of "functional synonyms" for the subject headings based on the words to be found in the titles under the headings. They stated that these words were "functional synonyms" for the subject headings and that any title containing one of these words could have been assigned automatically to the subject heading.

In Table 3 on page 362 of their study, they give the following list of terms as functional synonyms for the subject heading ALLERGY: allergy(s), allergic, allergen(s), allergenic, allergology, hyperallergy, sensitization, sensitized, autosensitization, desensitization, hypersensitivity, autoimmune, reaction, reagin, anaphylaxis, anaphylactic, anaphylactoid.

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[2]Christine Montgomery and Don R. Swanson, "Machine-Like Indexing by People," American Documentation XIII (October 1962): 359-366.

[3]Ibid., p. 359.

To judge from this example, the categories of functional synonyms established in the Montgomery and Swanson study encompass terms with a smaller degree of relatedness than would have been allowed in the concept categories established for this study.

Another study which investigated the degree to which words in a title replicated (matched) or were synonymous to subject headings assigned to the title by human indexers was done by Kraft.[4] Kraft states:

> Interpretation of data revealed, among other things, that 64.4% of the title entries contained as keywords one or more of the ILP [Index to Legal Periodicals] subject heading words under which they were indexed; and 25.1% contained logical equivalents.[5]

Kraft grouped the titles in his study into five types based on five degrees of synonymy or replication. Types 1 and 2 required replication of a word or a root form of a word that appeared in its subject heading for it to be counted as a "matching term".

Titles of Type 3 and Type 4 were described as follows.

> Type 3. A title which contains a synonym of its ILP subject heading.
> Example:
> ILP Heading: Atomic Energy
> Title: "Federal Organization for Licensing Major Nuclear Activities."
> Since 'nuclear' in common usage is a synonym of 'atomic energy', this title is considered as Type 3.[6]

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[4]Donald H. Kraft, "A Comparison of Keyword-in-Context (KWIC) Indexing of Titles With a Subject Heading Classification System." American Documentation XV (January 1964): 48-52.

[5]Ibid., p. 48.

[6]Ibid., p. 49.

Type 4. A title not of Types 1, 2, or 3, but which contains keywords that would enable a legal researcher to find it in an obvious manner under a KWIC indexing system.
Example:
ILP Heading: Collisions at Sea
Title: "Navigational Lights of Warships of Special Construction: Laws Concerning."[7]

In his study, Kraft includes titles of Type 3 and Type 4 as "logical equivalents" to the subject headings assigned to them. This is a categorization based on synonymy since synonymy may be defined as "a word or expression accepted as a figurative or symbolic substitute for another word or expression."[8]

Type 3 synonymy would have been acceptable in the concept categorization process for this study. Type 4 synonymy would not have been acceptable.

These studies are mentioned here for two reasons.

1. To demonstrate that synonymy of terms has been used as a basis for establishing replication of term in indexing studies other than indexer consistency studies.
2. To demonstrate, by at least two non-indexer consistency studies, that the concept categorizations based on synonymy in this study require a greater degree of relatedness among terms included in the concept category than did these other studies.

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[7]Ibid.

[8]The American Heritage Dictionary of the English Language, William Morris, ed. (New York: American Heritage Publishing Co., Inc., 1969), p. 1305.

CHAPTER V

FINDINGS

Display of Statistical Findings

The findings of this study are based on the statistics arrived at through use of the formulas given in Chapter III. The statistics were arranged in tables. These tables, displaying statistics for each of the 10 pairs of analysts for each of the 25 articles in each of the 22 packets in the study, total 154 pages. Those for Packet XI are displayed in the seven pages comprising Table V - 1 which follow this discussion.

Table V - 1 displays the concept consistency scores (column 3) and the terminology consistency scores (column 4) for each of the ten pairs of analysts (identified by initials in column 2) for each article (identified by number in column 1) in Packet XI. The arithmetic mean of the concept consistency scores and the arithmetic mean of the terminology consistency scores for each pair of analysts for each article are displayed in columns 5 and 6.

Appendix G contains the tables for Packets VIII, IX, and X. Tables for the other packets in the study may be obtained from the investigator through 1977. As stated before, all of the raw data, tables, instructions and other materials

TABLE V - 1
PACKET XI
PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0011	AB and KC	20.0%	0.0%		
	AB and WM	33.3%	0.0%		
	AB and MS	40.0%	25.0%		
	AB and KW	50.0%	0.0%		
	KC and WM	14.3%	0.0%		
	KC and MS	16.7%	0.0%		
	KC and KW	50.0%	0.0%		
	WM and MS	28.6%	0.0%		
	WM and KW	14.3%	0.0%		
	MS and KW	16.7%	0.0%		
				28.4%	2.5%
0029	AB and KC	60.0%	0.0%		
	AB and WM	14.3%	0.0%		
	AB and MS	28.6%	0.0%		
	AB and KW	25.0%	0.0%		
	KC and WM	42.9%	0.0%		
	KC and MS	57.1%	0.0%		
	KC and KW	50.0%	0.0%		
	WM and MS	22.2%	0.0%		
	WM and KW	20.0%	0.0%		
	MS and KW	62.5%	0.0%		
				38.3%	0.0%
0009	AB and KC	0.0%	0.0%		
	AB and WM	50.0%	0.0%		
	AB and MS	50.0%	0.0%		
	AB and KW	33.3%	0.0%		
	KC and WM	33.3%	0.0%		
	KC and MS	33.3%	0.0%		
	KC and KW	66.7%	0.0%		
	WM and MS	100.0%	0.0%		
	WM and KW	66.7%	0.0%		
	MS and KW	66.7%	0.0%		
				50.0%	0.0%
0103	AB and KC	28.6%	0.0%		
	AB and WM	40.0%	0.0%		
	AB and MS	50.0%	0.0%		
	AB and KW	33.3%	0.0%		
	KC and WM	14.3%	14.2%		
	KC and MS	25.0%	0.0%		
	KC and KW	18.2%	0.0%		
	WM and MS	14.3%	0.0%		
	WM and KW	22.2%	0.0%		
	MS and KW	44.4%	0.0%		
				29.0%	1.4%

TABLE V - 1 (continued)
PACKET XI
PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0178	AB and KC	42.9%	0.0%		
	AB and WM	14.3%	0.0%		
	AB and MS	16.7%	0.0%		
	AB and KW	50.0%	0.0%		
	KC and WM	33.3%	0.0%		
	KC and MS	16.7%	0.0%		
	KC and KW	33.3%	0.0%		
	WM and MS	0.0%	0.0%		
	WM and KW	11.1%	0.0%		
	MS and KW	12.5%	0.0%		
				23.1%	0.0%
0253	AB and KC	20.0%	0.0%		
	AB and WM	22.2%	0.0%		
	AB and MS	50.0%	0.0%		
	AB and KW	30.8%	0.0%		
	KC and WM	28.6%	0.0%		
	KC and MS	42.9%	0.0%		
	KC and KW	25.0%	0.0%		
	WM and MS	50.0%	50.0%		
	WM and KW	27.3%	0.0%		
	MS and KW	36.4%	0.0%		
				33.3%	5.0%
0266	AB and KC	50.0%	0.0%		
	AB and WM	0.0%	0.0%		
	AB and MS	25.0%	0.0%		
	AB and KW	25.0%	0.0%		
	KC and WM	0.0%	0.0%		
	KC and MS	25.0%	0.0%		
	KC and KW	25.0%	0.0%		
	WM and MS	16.7%	0.0%		
	WM and KW	9.1%	0.0%		
	MS and KW	12.5%	0.0%		
				18.8%	0.0%
0323	AB and KC	30.0%	0.0%		
	AB and WM	14.3%	0.0%		
	AB and MS	50.0%	0.0%		
	AB and KW	33.3%	0.0%		
	KC and WM	0.0%	0.0%		
	KC and MS	37.5%	0.0%		
	KC and KW	25.0%	0.0%		
	WM and MS	20.0%	33.3%		
	WM and KW	11.1%	0.0%		
	MS and KW	40.0%	0.0%		
				26.1%	3.3%

TABLE V - 1 (continued)
PACKET XI
PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0329	AB and KC	40.0%	0.0%		
	AB and WM	0.0%	0.0%		
	AB and MS	100.0%	0.0%		
	AB and KW	60.0%	0.0%		
	KC and WM	10.0%	0.0%		
	KC and MS	40.0%	0.0%		
	KC and KW	50.0%	0.0%		
	WM and MS	0.0%	0.0%		
	WM and KW	9.1%	0.0%		
	MS and KW	60.0%	0.0%		
				36.9%	0.0%
0336	AB and KC	75.0%	0.0%		
	AB and WM	50.0%	0.0%		
	AB and MS	33.3%	16.7%		
	AB and KW	75.0%	0.0%		
	KC and WM	40.0%	33.3%		
	KC and MS	28.6%	0.0%		
	KC and KW	60.0%	0.0%		
	WM and MS	14.3%	0.0%		
	WM and KW	40.0%	0.0%		
	MS and KW	28.6%	0.0%		
				44.5%	5.0%
0395	AB and KC	20.0%	0.0%		
	AB and WM	14.3%	0.0%		
	AB and MS	20.0%	0.0%		
	AB and KW	28.6%	0.0%		
	KC and WM	25.0%	25.0%		
	KC and MS	14.3%	12.5%		
	KC and KW	22.2%	0.0%		
	WM and MS	25.0%	22.2%		
	WM and KW	18.2%	0.0%		
	MS and KW	22.2%	0.0%		
				21.0%	5.9%
0425	AB and KC	40.0%	0.0%		
	AB and WM	66.7%	0.0%		
	AB and MS	80.0%	0.0%		
	AB and KW	28.6%	0.0%		
	KC and WM	16.7%	0.0%		
	KC and MS	20.0%	0.0%		
	KC and KW	50.0%	0.0%		
	WM and MS	80.0%	0.0%		
	WM and KW	12.5%	0.0%		
	MS and KW	14.3%	0.0%		
				40.9%	0.0%

TABLE V - 1 (continued)
PACKET XI
PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0441	AB and KC	40.0%	0.0%		
	AB and WM	0.0%	0.0%		
	AB and MS	50.0%	0.0%		
	AB and KW	33.3%	0.0%		
	KC and WM	0.0%	0.0%		
	KC and MS	25.0%	0.0%		
	KC and KW	30.0%	0.0%		
	WM and MS	20.0%	0.0%		
	WM and KW	15.4%	0.0%		
	MS and KW	66.7%	0.0%		
				28.0%	0.0%
0466	AB and KC	12.5%	0.0%		
	AB and WM	25.0%	0.0%		
	AB and MS	40.0%	0.0%		
	AB and KW	25.0%	0.0%		
	KC and WM	14.3%	0.0%		
	KC and MS	25.0%	0.0%		
	KC and KW	18.2%	0.0%		
	WM and MS	20.0%	20.0%		
	WM and KW	12.5%	0.0%		
	MS and KW	10.0%	0.0%		
				20.3%	2.0%
0516	AB and KC	50.0%	0.0%		
	AB and WM	28.6%	0.0%		
	AB and MS	42.9%	0.0%		
	AB and KW	37.5%	0.0%		
	KC and WM	28.6%	0.0%		
	KC and MS	42.9%	0.0%		
	KC and KW	37.5%	0.0%		
	WM and MS	62.5%	22.2%		
	WM and KW	55.6%	0.0%		
	MS and KW	66.7%	0.0%		
				45.3%	2.2%
0552	AB and KC	75.0%	0.0%		
	AB and WM	40.0%	0.0%		
	AB and MS	60.0%	0.0%		
	AB and KW	42.9%	0.0%		
	KC and WM	33.3%	0.0%		
	KC and MS	50.0%	0.0%		
	KC and KW	57.1%	0.0%		
	WM and MS	28.6%	14.3%		
	WM and KW	37.5%	28.6%		
	MS and KW	50.0%	9.0%		
				47.4%	5.2%

TABLE V - 1 (continued)
PACKET XI
PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0571	AB and KC	23.1%	0.0%		
	AB and WM	28.6%	0.0%		
	AB and MS	18.2%	0.0%		
	AB and KW	66.7%	0.0%		
	KC and WM	41.7%	14.2%		
	KC and MS	50.0%	0.0%		
	KC and KW	28.6%	0.0%		
	WM and MS	40.0%	0.0%		
	WM and KW	22.2%	0.0%		
	MS and KW	25.0%	0.0%		
				34.4%	1.4%
0594	AB and KC	100.0%	0.0%		
	AB and WM	50.0%	0.0%		
	AB and MS	100.0%	0.0%		
	AB and KW	40.0%	0.0%		
	KC and WM	50.0%	0.0%		
	KC and MS	100.0%	0.0%		
	KC and KW	40.0%	0.0%		
	WM and MS	50.0%	33.3%		
	WM and KW	28.6%	0.0%		
	MS and KW	40.0%	0.0%		
				59.9%	3.3%
0765	AB and KC	60.0%	0.0%		
	AB and WM	14.3%	0.0%		
	AB and MS	37.5%	0.0%		
	AB and KW	50.0%	0.0%		
	KC and WM	14.3%	0.0%		
	KC and MS	57.1%	0.0%		
	KC and KW	50.0%	0.0%		
	WM and MS	22.2%	11.1%		
	WM and KW	9.1%	0.0%		
	MS and KW	36.4%	0.0%		
				35.1%	1.1%
0833	AB and KC	66.7%	0.0%		
	AB and WM	18.2%	0.0%		
	AB and MS	22.2%	0.0%		
	AB and KW	44.4%	0.0%		
	KC and WM	10.0%	9.1%		
	KC and MS	12.5%	0.0%		
	KC and KW	37.5%	0.0%		
	WM and MS	20.0%	0.0%		
	WM and KW	27.3%	0.0%		
	MS and KW	20.0%	0.0%		
				27.9%	0.9%

TABLE V - 1 (continued)
PACKET XI
PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0836	AB and KC	50.0%	0.0%		
	AB and WM	25.0%	0.0%		
	AB and MS	28.6%	0.0%		
	AB and KW	42.9%	0.0%		
	KC and WM	28.6%	0.0%		
	KC and MS	60.0%	0.0%		
	KC and KW	80.0%	0.0%		
	WM and MS	12.5%	0.0%		
	WM and KW	42.9%	0.0%		
	MS and KW	50.0%	0.0%		
				42.1%	0.0%
0948	AB and KC	66.7%	0.0%		
	AB and WM	25.0%	0.0%		
	AB and MS	60.0%	0.0%		
	AB and KW	30.0%	0.0%		
	KC and WM	20.0%	8.3%		
	KC and MS	42.9%	0.0%		
	KC and KW	25.0%	0.0%		
	WM and MS	25.0%	0.0%		
	WM and KW	15.4%	0.0%		
	MS and KW	44.4%	0.0%		
				35.4%	0.8%
0980	AB and KC	50.0%	0.0%		
	AB and WM	50.0%	0.0%		
	AB and MS	33.3%	0.0%		
	AB and KW	11.1%	0.0%		
	KC and WM	40.0%	0.0%		
	KC and MS	30.0%	0.0%		
	KC and KW	22.2%	0.0%		
	WM and MS	25.0%	0.0%		
	WM and KW	14.3%	0.0%		
	MS and KW	55.6%	0.0%		
				33.2%	0.0%
1035	AB and KC	50.0%	0.0%		
	AB and WM	33.3%	0.0%		
	AB and MS	42.9%	0.0%		
	AB and KW	100.0%	0.0%		
	KC and WM	33.3%	0.0%		
	KC and MS	42.9%	0.0%		
	KC and KW	50.0%	0.0%		
	WM and MS	71.4%	10.0%		
	WM and KW	33.3%	0.0%		
	MS and KW	42.9%	0.0%		
				50.0%	1.0%

TABLE V - 1 (continued)

PACKET XI

PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
1043	AB and KC	50.0%	33.3%		
	AB and WM	25.0%	0.0%		
	AB and MS	25.0%	0.0%		
	AB and KW	57.1%	0.0%		
	KC and WM	18.2%	10.0%		
	KC and MS	33.3%	20.0%		
	KC and KW	28.6%	0.0%		
	WM and MS	41.7%	8.3%		
	WM and KW	20.0%	0.0%		
	MS and KW	30.0%	0.0%		
				32.9%	7.2%

used in this study will be retained for at least this five year period to allow other researchers to check the findings and because they may be of use for further studies.

In addition to the tables described above, tables of the percentile ranges for the mean inter-indexer concept consistency, the mean inter-indexer terminology consistency, and the number of percentage points difference between the two, were constructed for each article for all of the packets. All of these tables will be found in Appendix H.

Comparison of the Statistical Findings of Concept Categorizations Done by Different Categorizers

Twenty of the 22 packets of articles in this study were concept categorized by one person, the investigator. The four packets for which the tables of percentages of consistency are displayed in full, (Packets VIII, IX, and X in Appendix G, and Packet XI on the preceding pages), were chosen for display because they confirm the statement that the pattern of and the relationships between the consistency percentages do not vary from packet to packet with the person who is doing the concept categorization. The patterns and relationships are similar for every packet, even though the concept categorizations were done by different people. Packets X and XI were categorized by the investigator. Packet VIII was categorized by someone else, and Packet IX was categorized by still another person.

Each of the categorizers had been an indexer for the study. None had analyzed the materials in the packet the indexing of which she was asked to categorize. Each was asked to do the categorization in accordance with the instructions in Appendix E.

Table V - 2 displays the percentile ranges for the mean concept consistency scores and the mean terminology consistency scores for Packets VIII, IX, and X.

As can be seen in Table V - 2, for each of these packets, the mean concept consistency scores cluster near the middle of the percentile ranges. The mean terminology consistency scores cluster at the low end of the percentile ranges. There was no instance in these packets, or indeed, in any of the packets in the study, in which the concept consistency score was lower than the terminology consistency score; and the number of percentage points difference between the two consistency scores in these three packets was never less than 14.2 and ranged as high as 78.0.

Since the categorizers differed in experience, education, and points of view, it might be supposed that this would create bias in their concept categorizations and that therefore the findings for the packets categorized by different people would show variations in pattern.

The findings for Packets VIII, IX, and X did not vary in any significant or substantive way from the findings of the other packets in the study, even though they had each been categorized by different people. Since the comparisons

TABLE V - 2

PERCENTILE RANGES FOR ARTICLES IN PACKETS VIII, IX, AND X

PERCENTILE RANGE	PACKET VIII		PACKET IX		PACKET X		TOTALS	
	CC*	TC**	CC*	TC**	CC*	TC**	CC*	TC**
0.0 - 0.9	0	4	0	14	0	17	0	35
1.0 - 10.9	0	19	0	10	0	8	0	37
11.0 - 20.9	4	2	1	1	1	0	6	3
21.0 - 30.9	9	0	11	0	6	0	26	0
31.0 - 40.9	7	0	8	0	10	0	25	0
41.0 - 50.9	4	0	2	0	3	0	9	0
51.0 - 60.9	0	0	3	0	5	0	8	0
61.0 - 70.9	0	0	0	0	0	0	0	0
71.0 - 80.9	1	0	0	0	0	0	1	0
81.9 - 90.9	0	0	0	0	0	0	0	0
91.0 - 100	0	0	0	0	0	0	0	0

* Mean concept consistency

** Mean terminology consistency

TABLE V - 3

PERCENTILE RANGES FOR MEAN INTER-INDEXER CONCEPT CONSISTENCY AND MEAN INTER-INDEXER TERMINOLOGY CONSISTENCY FOR ALL ARTICLES IN THE STUDY

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	200
1.0 - 10.9	1	312
11.0 - 20.9	24	34
21.0 - 30.9	113	4
31.0 - 40.9	198	0
41.0 - 50.9	136	0
51.0 - 60.9	61	0
61.0 - 70.9	12	0
71.0 - 80.9	4	0
81.0 - 90.9	1	0
91.0 - 100	0	0

were based on statistical results, and there were no expectations that the exact categorizations established by one categorizer would be reproduced by a different categorizer, individual packets were not categorized more than once. The fact that the statistical findings of packets categorized by different people showed the same pattern for each packet is an indication of the validity of the methodology. In the discussion that follows, these packets will not be treated separately from the other packets in the study.

Percentile Ranges for Mean Concept Consistency Scores and Mean Terminology Consistency Scores for All Articles in Study

Table V - 3 displays the percentile ranges for the mean concept consistency scores and the mean terminology consistency scores for all of the articles in the study. It will be discussed in the following section of this chapter.

For each packet, a similar pattern emerges in the percentile ranges for mean inter-indexer consistency in perception of concept scores and for mean inter-indexer consistency in choice of terminology scores. The fact that the pattern repeats itself for each individual packet and for all packets in the study taken as a whole, even though each packet had different articles, a different combination of indexers, and in two cases, different categorizers, provides a further check on the validity of the methodology. For each packet, and for all packets in the study taken as a whole, the mean inter-indexer concept consistency scores cluster at

11.0 percentage points higher than the mean inter-indexer terminology consistency score.

The number of percentage points difference between mean concept consistency scores and mean terminology consistency scores was never less than 5.1 and ranged as high as 84.0 percentage points difference.

Percentile Ranges for the Number of Percentage Points Difference Between the Mean Concept Consistency Score and the Mean Terminology Consistency Score

Table V - 4 displays the percentile ranges for the number of percentage points difference between the mean concept consistency score and the mean terminology consistency score for each article in the study. These were derived by subtracting the mean terminology consistency score for each article from the mean concept consistency score for the article, thus arriving at a measure of the number of percentage points difference between them.

The fact that the mean concept consistency scores were always higher than the mean terminology consistency scores, and that, for 500 of the 550 articles, the mean concept consistency score was 21.0 or more percentage points higher than the mean terminology consistency score shows that a gross difference exists between these two facets of subject indexing -- a difference that has not been investigated in the past because of the previous approach to the measurement of inter-indexer consistency which did not attempt to differen-

the middle of the percentile ranges. The mean inter-indexer terminology consistency scores cluster at the low end of the percentile ranges. None of the mean concept consistency scores are in the 0.0% to 0.9% percentile range. Two hundred of the mean terminology consistency scores are in the 0.0% to 0.9% percentile range.

Although there were individual pairs of analysts in a small number of articles who scored 0.0% on concept consistency, there was no article for which the mean concept consistency was lower than 9.4%. There were 181 articles, at least 2 in each packet, for which the mean terminology consistency was 0.0%.

Of the 550 articles in the study, 512 had a mean inter-indexer terminology consistency score of 10.9% or less. Only one of the 550 articles had a mean inter-indexer concept consistency score of 10.9% or less and only 25 had a mean inter-indexer concept consistency score of 20.9% or less. Five hundred forty-six had a mean terminology consistency score of 20.9% or less.

Of the 550 articles in the study, only 4 had a mean inter-indexer terminology consistency of 21.0% or more. Five hundred twenty-five of the 550 articles had a mean inter-indexer concept consistency score of 21.0% or more.

There was no instance in which the mean inter-indexer concept consistency score was lower than the mean inter-indexer terminology score. In 545 of the 550 articles, the mean inter-indexer concept consistency score was at least

TABLE V - 4

NUMBER OF PERCENTILE POINTS DIFFERENCE BETWEEN THE MEAN INTER-INDEXER CONCEPT CONSISTENCY SCORES AND THE MEAN INTER-INDEXER TERMINOLOGY CONSISTENCY SCORES FOR ALL OF THE ARTICLES IN THE STUDY

PERCENTILE RANGE	NUMBER OF ARTICLES IN EACH PERCENTILE RANGE
0.0 - 0.9	0
1.0 - 10.9	5
11.0 - 20.9	45
21.0 - 30.9	152
31.0 - 40.9	183
41.0 - 50.9	109
51.0 - 60.9	42
61.0 - 70.9	12
71.0 - 80.9	1
81.0 - 90.9	1
91.0 - 100	0

tiate between the two facets of indexing, but encompassed them both in a single measurement.

Articles with High Mean Concept Consistency Scores

Table V - 5 displays the consistency scores for the 17 articles in the study that had a mean concept consistency score of 61.0% or higher. Six of these 17 had a mean terminology consistency score of 0.0%. Only 3 had a mean terminology consistency score of 10.0% or higher.

Articles with High
Mean Terminology Consistency Scores

Table V - 6 displays the consistency scores for the 16 articles in the study that had a mean terminology consistency score of 15.0% or more. The lowest mean concept consistency score for this group of articles was 28.0% and 11 of the 16 articles had a mean concept consistency score of 40.0% or higher. In this group of "high" terminology consistency scores, only two articles had a higher consistency in terminology than the lowest of the concept consistency scores.

TABLE V - 5

ARTICLES WITH HIGH MEAN CONCEPT CONSISTENCY SCORES
(61.0% or above)

ARTICLE NUMBER	PACKET NUMBER	MEAN CONCEPT CONSISTENCY SCORE	MEAN TERMINOLOGY CONSISTENCY SCORE
1240	I	62.5%	0.0%
1096	II	74.0%	10.7%
1193	III	84.0%	0.0%
1232	III	66.6%	2.5%
1099	IV	65.6%	1.5%
0557	V	64.7%	3.3%
1034	V	62.3%	1.5%
0545	VII	62.2%	0.0%
1039	VIII	78.0%	0.0%
0636	XII	66.7%	0.0%
0383	XIV	73.0%	16.3%
0712	XV	61.0%	1.7%
0398	XVI	72.5%	10.0%
0742	XVI	62.7%	5.0%
0250	XVII	63.3%	0.0%
0909	XVII	70.0%	2.0%
0267	XXII	66.7%	1.7%

TABLE V - 6

ARTICLES WITH HIGH MEAN TERMINOLOGY CONSISTENCY SCORES
(15.0% or above)

ARTICLE NUMBER	PACKET NUMBER	MEAN CONCEPT CONSISTENCY SCORE	MEAN TERMINOLOGY CONSISTENCY SCORE
1094	I	56.0%	19.9%
1069	IV	54.1%	25.7%
0073	VI	44.3%	18.9%
0047	XIII	39.5%	15.3%
0132	XIII	56.7%	16.4%
0346	XIII	42.8%	15.2%
0412	XIII	53.8%	15.0%
0044	XIV	35.8%	15.0%
0383	XIV	73.0%	16.3%
0588	XV	41.0%	19.0%
0724	XVII	57.5%	30.0%
0678	XIX	28.0%	15.8%
0910	XIX	52.0%	15.8%
0396	XXI	36.4%	29.2%
0409	XXI	40.0%	21.7%
0263	XXII	39.0%	18.6%

It seemed important to try to ascertain if there was a bias in the data that would have had an influence on the findings of this study. Therefore, all of the texts and all of the analysts' verbal labels for the articles that appeared in Table V - 5 (Articles with high mean concept consistency scores) and Table V - 6 (Articles with high mean terminology consistency scores) were subjected to a gross examination to see if any of the following variables could be identified as distinguishing the articles in one table from the articles in the other:

1. Number of verbal labels created by each analyst;
2. Number of "name" or "name-like" verbal labels;
3. Degree of analysts' comprehension of text as indicated on data gathering sheet;
4. Number of "sentence-like" verbal labels;
5. The presence or absence in the analysts' verbal labels of the concepts or terminology used in the sub-heads of the article;
6. The presence or absence in the analysts' verbal labels of concepts or terminology used in the title of the article;
7. The length of the article.

None of these variables could be said to be distinctive of one group or the other.

There seemed to be no relationship between high concept consistency and high terminology consistency. Only one article appears in both the high (61.0% or above) mean concept consistency table and the high (15.0% or above) mean

terminolcgy consistency table. This is article number 0383, Packet XIV: George Douglas Mayo and Alexander A. Longo, "Training Time and Programed Instruction", Journal of Applied Psychology, L (February 1966) 1-4. This investigator could find no distinguishing characteristics in the text of the article or in the verbal labels of the analysts that could account for the fact that the article had both a high mean concept consistency score and a high mean terminology consistency score.

Articles with 61.0 Percentage Points or More Difference Between the Mean Concept Consistency Score and the Mean Terminology Consistency Score

Table V - 7 displays the mean consistency scores of the 13 articles in the study that had a difference of 61.0 percentage points or more between the mean concept consistency score and the mean terminology consistency score. All of these articles also appear in Table V - 5 (Articles with high mean concept consistency scores). This was to be expected of course, since all the articles in Table V - 7 would have to have a mean concept consistency score of 61.0% or above. None of the articles in Table V - 7 appear in Table V - 6 (Articles with high mean terminology consistency scores).

TABLE V - 7

ARTICLES WITH 61.0% OR MORE DIFFERENCE BETWEEN THE MEAN CONCEPT CONSISTENCY SCORE AND THE MEAN TERMINOLOGY CONSISTENCY SCORE

ARTICLE NUMBER	PACKET NUMBER	MEAN CONCEPT CONSISTENCY SCORE	MEAN TERMINOLOGY CONSISTENCY SCORE
1240	I	62.5%	0.0%
1096	II	74.0%	10.7%
1193	III	84.0%	0.0%
1232	III	66.6%	2.5%
1099	IV	65.6%	1.5%
0557	V	64.7%	3.3%
0545	VII	62.2%	0.0%
1039	VIII	78.0%	0.0%
0636	XII	66.7%	0.0%
0398	XVI	72.5%	10.0%
0250	XVII	63.3%	0.0%
0909	XVII	70.0%	2.0%
0267	XXII	66.7%	1.7%

Articles with 15.0 Percentage Points or Less Difference Between the Mean Concept Consistency Score and the Mean Terminology Consistency Score

Table V - 8 displays the mean consistency scores of the 11 articles in the study with a difference of 15.0 percentage points or less between the mean concept consistency score and the mean terminology consistency score. None of these articles appear in Table V - 5 (Articles with high mean concept consistency scores) but two appear in Table V - 6 (Articles with high mean terminology consistency scores). These two articles were Article 0678, Packet XIX: Emmet N. Leith, "Holography -- Lenseless 3D Photography," Industrial Research (August 1966): 41-43.; and Article 0396, Packet XXI: "Office for Scientific and Technical Information," Chemistry in Britain (1967): 17-18. The texts and analysts' verbal labels for articles appearing in Table V - 8 were examined for the variables listed previously, and again, none of these variables could be said to be characteristic of this group in particular. However, as a group, the mean concept consistency scores for the articles in Table V - 8 were lower than the mean concept consistency scores for the articles in the study as a whole, 7 of the 11 articles having a mean concept consistency score of 20.9% or less.

TABLE V - 8

ARTICLES WITH 15.0 OR LESS PERCENTAGE POINTS DIFFERENCE BETWEEN THE MEAN CONCEPT CONSISTENCY SCORE AND THE MEAN TERMINOLOGY CONSISTENCY SCORE

ARTICLE NUMBER	PACKET NUMBER	MEAN CONCEPT CONSISTENCY SCORE	MEAN TERMINOLOGY CONSISTENCY SCORE
0872	VIII	25.8%	11.6%
0960	VIII	14.9%	0.0%
0294	X	14.4%	0.0%
0605	XII	27.9%	13.9%
0289	XII	9.4%	2.1%
0112	XVIII	13.4%	1.1%
0678	XIX	28.0%	15.8%
0319	XX	20.6%	6.4%
0502	XX	17.9%	12.8%
0396	XXI	36.4%	29.2%
0232	XXII	13.0%	7.7%

Two articles in the above table share the distinction of being the only ones in the study for which an analyst was unable to create verbal labels. Although the analysts' instructions clearly stated that they could leave the data gathering sheet blank if they felt they could not analyze an article for concepts, apparently only one analyst felt it necessary to do this. She did not create verbal labels for Article 0289, Packet XII: Jean M. Perreault, "Coterminous or Specific: A Rejoinder to Headings and Canons," Journal of Documentation XXII (December 1966): 319-327; and Article 0605, Packet XII: C.K. Chow, and C.N. Liu, "An Approach to Structure Adaptation in Pattern Recognition," IEEE Transactions SSC-2 (December 1966): 73-80.

These are comparatively difficult and technical articles. However, they are not any more difficult or technical than many other articles in the study, or even more difficult or technical than other articles which this particular analyst had worked on in another packet.

Validation of the Hypothesis

This study was concerned with the definition of the term "indexer consistency" and with the use of this definition in establishing quantitative measurements of indexer consistency.

Previous studies had defined indexer consistency in terms of degree of replication in the index terms chosen independently by two or more indexers, or by the same indexer at different times, to label the informational content of a given text as a means of providing access to the text. This definition of indexer consistency presented it as an undifferentiated mix in which the two steps in the indexing process were unconsciously combined in an undifferentiated manner.

The basic assumptions of this study were:

1. That indexing is an order-dependent technique in that a concept must be perceived before it can be expressed in an index term; and
2. That perception of concepts is a process distinct from the process of choosing terms with which to characterize the concepts perceived.

This study therefore postulated that indexer consistency should be defined as having two parts:

1. Indexer consistency in perception of indexable matter

(consistency in choice of subject concepts); and

2. Indexer consistency in choice of term with which to label the indexable matter perceived.

In the interests of clarity, throughout this study, the second part of "indexer consistency" has been referred to as indexer consistency in choice of terminology. Use of this terminological label in this way is consistent with its use in previous studies, where it represented an undifferentiated mix of concept and words, and has been useful for the purposes of this study. It is necessary to make clear, however, that form and function combine in index terms, as in language in general, so that although a concept may be separated from the term used to describe it and may exist in a non-word form as exemplified by a non-word symbol, or may be characterized by more than one terminological label, the words in an index term, by definition, represent the concept they are meant to characterize in the term, although they may also be used to characterize other concepts in other terms.

In the index term itself, therefore, the form of the word and the function of the word are combined. The function of the index term is to represent the concept. The form of the index term is the actual word or words used. Therefore, in this study, "indexer consistency in choice of terminology" represents what was referred to in previous indexer consistency studies as "indexer consistency", and may be thought of as an overall measurement that combines both kinds of con-

sistency. The separation of this kind of indexer consistency from indexer consistency in choice of concepts has been the focus of this study.

The hypothesis to be tested was that the degree of indexer consistency in the perception of indexable matter can be measured separately from and will be different in extent from the degree of indexer consistency in the terminology chosen to characterize that indexable matter.

Because indexing is an order dependent process, in that indexable concepts must be perceived before they can be expressed in words, there was no expectation that indexer consistency in choice of terminology would exceed indexer consistency in perception of concepts. Two possibilities remained:

1. That indexer consistency in choice of terminology would equal indexer consistency in perception of concept; or
2. That indexer consistency in choice of terminology would be less than indexer consistency in perception of concept.

If the findings of this study had been that overall indexer consistency that is, what has been called indexer consistency in choice of terminology, was equal to or only marginally less than indexer consistency in perception of concept, the study might have been inconclusive, and the hypothesis not substantiated. However, in this study, for 500 of the 550 articles in the sample, there was a difference of 21.0 percentage points or more between the mean overall indexer consistency as represented by the terminology consistency score and the mean indexer consistency in perception

of concept score. In only five articles was the difference between these two scores less than 10 percentage points.

Thus, the consistency with which the analysts identified concepts in the articles was always significantly higher than the consistency with which they chose terminology to characterize the concepts they perceived. This was true for each of the 550 articles in the study and for all of the analysts in the study.

Each packet of 25 articles presented the above pattern. It did not vary with variations in the education or work·experience of the analysts, with the contents of the packets, or with the categorizers who established concept categories. Each grouping of articles (those with "high" mean concept consistency; "high" mean terminology consistency; "high" difference between mean concept consistency and mean terminology consistency; and "low" difference between mean concept consistency and mean terminology consistency) contained articles from many different packets.

"Low" mean concept consistency scores and "low" mean terminology consistency scores were not compared since 512 of the 550 articles had a mean terminology consistency score of 10.9% or less, while only 1 of the mean concept consistency scores fell in this category.

Because no official list of terminology was given to the indexers, a high degree of consistency in choice of terminology was not expected. On the other hand, all of the indexers had been educated in the same subject discipline and

therefore had a common professional vocabulary; all were told to be specific, not generic in their choice of terms; and the degree of difference between the mean concept consistency scores and the mean terminology consistency scores (more than 21.0 percentage points for 500 of the 550 articles) was a gross difference.

The instructions given the indexers on how to choose indexable matter from text were more explicit than the instructions given them for choice of terminology, but the instructions did not indicate either what kind of concepts were to be considered indexable or the number of concepts that should be identified for each article.

The indexers were told to be exhaustive, not selective, in their choice of indexable concepts. They were told to name all the concepts in each article on which useful information was given. They were given a generalized context for their work: a library or information center containing materials on information science, documentation, and librarianship.

Given the large differences shown by the data, and making allowances for possible statistical error, it appears evident that the two indexing steps studied are, as Bernier and others have noted, distinct; that they can be measured separately; that they differ significantly in degree of consistency; and that the definition and measurement of indexer consistency should reflect this.

The experimental instruments and methods used in this study were not highly precise in the statistical meaning of

the word, however, they were statistically accurate. The findings show such a large difference between degree of inter-indexer consistency in perception of indexable matter and degree of inter-indexer consistency in choice of terminology with which to describe the indexable matter perceived, that there seems to be no question that these are separate entities and can and should be considered separately. Higher precision, although desirable, is not necessary for the purposes of this study.

Inter-indexer consistency in choice of concept and inter-indexer consistency in choice of terminology have not been separately considered in previous consistency studies nor have they been separately measured in the past. The point of this study was to do so. The need for the devising of more precise instruments of measurement and for further research in this area is evident.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND IMPLICATIONS OF THIS STUDY

Summary and Conclusions

This study was concerned with the definition of the concept known as "indexer consistency" and with the use of this definition in the quantitative measurement of indexer consistency.

Previous studies had defined indexer consistency as equal to the quantitative measure of the degree of match or replication (however this was defined) in the terminology chosen independently by two or more indexers, or by the same indexer at different times, to characterize the concepts the indexer(s) had perceived as indexable matter in the text.

Although analyses of the indexing process include these two major steps:

1. The identification of indexable matter in texts; and
2. The characterization of this indexable matter in words;

previous studies of indexer consistency do not explicitly consider these two parts of the indexing process separately. They make no explicit distinction between them in their final measurement of indexer consistency, although some of the studies show an awareness of the distinction between the two parts in their varying definitions of what may be considered

a "match" in terminology. The effect of this is that previous measurements of indexer consistency result in indexer consistency scores that commingle, in an uncontrolled and undifferentiated way, the two aspects of the indexing process. Indexer consistency in perception of indexable concepts in texts and indexer consistency in choice of terminology with which to characterize the indexable concepts perceived are not measured or expressed as separate parts of the problem of indexer consistency.

This study postulated:

1. That indexer consistency should be defined as consisting of two distinct parts:

a. Consistency in identification of indexable matter (perception of concepts in texts); and

b. Consistency in choice of terminology with which to label and communicate the concepts perceived;

2. That these can be measured separately;

3. That there will be a gross difference in the degree of each; and

4. That indexer consistency scores should be determined by a planned use of both measurements.

For the purposes of this study, a test situation was established in which 550 journal articles concerned with topics in the field of library and information science were analyzed for indexable concepts by a group of indexers whose education and work experience had been in this field.

Each article was analyzed by 5 people, a total of 2750 analyses in all. The verbal labels that these indexers created to characterize the concepts they perceived in the article were then examined.

The verbal labels were examined in order to establish:

1. The degree of replication in the terminology used to characterize the concepts the analysts had perceived in the text; and
2. The degree of replication in the concepts perceived.

This was done by:

1. A word-for-word comparison of terminology (in accordance with a definition of "match" in terminology as given in Chapter III); and
2. The establishment of concept categories based on synonymy and the mathematical concept of the fuzzy set (also described in Chapter III).

Similar mathematical formulas were used to arrive at separate measures for the degree of inter-indexer consistency in perception of concepts and the degree of inter-indexer consistency in choice of terminology with which to describe the concepts perceived.

The objective was to discover whether there would be a salient difference between the degree of inter-indexer consistency in perception of concepts and the degree of inter-indexer consistency in choice of terminology with which to characterize the concepts perceived.

The statistical findings of this study show that there is a material degree of difference between the consist-

ency with which these analysts perceived indexable matter in the texts analyzed and the degree of consistency or replication in the terms with which they characterized or communicated these concepts. Degree of consistency in choice of concept was always significantly higher than degree of consistency in choice of terminology. In 500 of the 550 articles, it was 21.0 percentage points or more higher.

Scores of mean inter-indexer consistency in choice of terminology ranged from 0.0% to 30.0%. There were 181 articles, at least 2 in each packet, for which the mean terminology consistency was 0.0%. Of the 550 articles in the study, 512 had a mean terminology consistency score of 10.9% or less; only one had a mean concept consistency score as low as this.

Scores of mean inter-indexer consistency in perception of concepts ranged from 9.4% to 84.0%. Of the 550 articles in the study, 525 had a mean concept consistency score of 21.0% or more. Two hundred fourteen had a mean concept consistency score of 41.0% or more.

Although it is relatively easy to establish criteria and define what is meant by "replication of terminology", establishing criteria and a definition of what is meant by "replication of concept" is comparatively difficult. This has not been consciously attempted in previous indexer consistency studies. The attempt to do so here does not represent a situation unique to studies of indexing methodology, however. Studies of other aspects of indexing technology in

which attempts were made to establish concept-based categories of synonymous terms, or of terms and their logical equivalents, have resulted in concept categories which encompass terms with smaller degrees of relatedness than was required of the terms in the concept categories established for this study. In addition, even though exact replication of concept categorizations by different categorizers was not expected, the results of this study show that substantial replication of the pattern of statistical results of categorizations done by different categorizers may be expected.

The findings of this study lead to the conclusions that:

1. The presently accepted definition of indexer consistency should be changed to include explicitly both indexer consistency in perception of concept and indexer consistency in choice of terminology (overall indexer consistency);
2. Measurements of indexer consistency should be composed of either

a. Two scores: consistency in perception of concept and consistency in choice of terminology, or

b. One score in which both of these measures are consciously included, with each, perhaps, being weighted separately.

Implications of this Study

The focus of this study has been on problems of indexer consistency. Its thesis is based on the fact that previous work on the definition of indexer consistency and

the construction of quantitative measures for indexer consistency have not formally differentiated between the effects of two basically different variables: consistency in the choice of indexable concepts in the text, and consistency in the verbal expression of the concepts so distinguished.

It is important to note that a measure of indexer consistency that combines these two variables without differentiating them may be quite valuable to the user or producer of a particular index. However, in investigations of the problem of indexer consistency outside the context of a specific working situation, it seems reasonable to try to approach the problem in relation to a more general indexing methodology and theory, the type of methodology and theory exemplified by the descriptions of the indexing process that have been cited earlier. This is what has been done here.

The inter-indexer concept consistency scores found in this study compare well with those of previous studies which stated that they measured terminology consistency, but which actually measured an undifferentiated "indexer consistency" including both consistency in terminology and consistency in perception of concept.

The consistency scores given in studies in which a "match" in terminology was defined fairly rigorously, ranged near the terminology consistency scores for this study. In studies which defined a match in terminology to include hierarchically related and synonymous terms and achieved a "match" in terminology through fairly substantial regularization of

the terminology, the consistency scores were roughly comparable to the concept consistency scores for this study.

It seems evident that in almost all reported indexer consistency studies, the designer of the study felt that an exact, character-for-character match in terminology was not a "satisfactory" measure of indexer consistency. In one sense, this may represent an attempt to allow for terminological or verbal inconsistency in expressing consistently identified concepts, though this idea is not so expressed in any of the studies cited.

Writers of previous studies who stated that they defined indexer consistency as consistency in choice of terminology, seemed not to be satisfied with a rigorous definition of "match" in terminology, but modified their definition to include varying degrees of "match", some of which were based on synonymy or hierarchal relationships. This partly accounts for the wide variation in their statistical findings and also accounts for the difficulty other investigators have found in trying to use their results as the basis for further research.

It is probable that if the analysts in this study had been given a list of terms, each of which precisely and unambiguously defined a concept in the articles they were asked to analyze, and had been required to use these terms to characterize the concepts they perceived, that the scores for terminology consistency would have been higher. No list of terms was given to them and they were explicitly instructed

that the verbal labels they created did not have to conform to any standard list of terms, although, if the analysts felt that it was appropriate, they could use terms from a standardized list or in a standardized form. No one actually used a standardized list, but it seems likely that remembered standardized forms of terms were used.

Vocabulary control, as exemplified by lists of terms authorized for use in a given system, is one of the methodological tools used to standardize index terminology. Vocabulary control may or may not have an effect on consistency in indexers' choice of terminology. However, if there is a list of authorized terms from which the indexers must choose, the probability of their choosing matching terms (however this is defined) would seem to be increased. The effect, if any, that a list of authorized terms would have on consistency in indexers' perception of concepts is as yet unknown.

In the study reported on here, no attempt was made to relate index quality to indexer consistency. The relationship, if any, between these two aspects of indexing has not been objectively established as yet and no attempt is made to do so here. Likewise, there was no attempt to distinguish between "significant" terms and concepts and "non-significant" terms and concepts. Indeed, there was no attempt to distinguish between what should or should not have been considered indexable matter for each text, and therefore, no judgements were made as to the quality of the indexing. The major objective of the study was simply to

record, compare, and analyze the concepts and the words used to record the concepts, that were perceived in the texts of the articles by the analysts employed in the study.

Implications of this Study for Thesaurus Construction and for Instructions to Indexers for the Use of Thesauri

Thesauri are lists of terms acceptable in a given information system, or terms perceived as appropriate for a given subject area. They also may contain definitions of the terms listed, scope notes, and a syndetic (cross reference) apparatus for the display of relationships. In practical use, thesauri also often serve the function of outlining and delimiting the concepts that are perceived by the makers and users of the thesaurus as lying within the area covered by the information system of which the thesaurus is a part.

A concept represented by a term in a thesaurus automatically becomes, in the mind of the indexer, an indexable concept for the information system of which the thesaurus is a part. The reverse of this, that a concept not represented by a term in the thesaurus will automatically not be perceived as an indexable concept, may or may not be true. In information systems where the indexer may add terms to the list of terms in the thesaurus relatively freely, this is almost certainly not true. But the extent to which, if at all, the listing of terms in a thesaurus affects the indexers' perception of what concepts in a text are indexable concepts is an area as yet unexplored. Will a "peripheral" concept be perceived more readily if it is represented by a term in the

thesaurus? Will "new" concepts, those as yet not represented by a term in the thesaurus, be perceived more slowly because they are not listed?

Thesauri also often cause a sort of "pigeon-holing" effect. That is, indexers attempt to fit the concepts they perceive in a text into the pigeon-holes established by the terms in the thesaurus. They perceive a concept and then try to find a term in the thesaurus with which to characterize it. Thus, there may be some loss in the accuracy or exactness with which a concept is characterized, but there is likely to be a gain in overall terminological consistency for the information system of which the thesaurus is a part.

Instructions to indexers on how to use a particular thesaurus (if written instructions are given) usually are concerned with application of the terms in the thesaurus and use of the syndetic apparatus. Instructions are usually scanty and there are usually no explicit rules defining what kinds of concepts should or should not be considered as indexable. In most thesauri, the only rules given (if any are given aside from the syndetic structure itself) are rules as to how to choose terms with which to label concepts, once they have been perceived as indexable, and how to structure the terms once chosen.

This study has demonstrated that the indexing process may be separated into the components: 1) perception of indexable concepts; 2) expression of those concepts in words. These two aspects of the indexing process should be considered

separately in the construction of a thesaurus, and they often are. Information scientists or librarians working to build a list of authorized terms, attempt to provide terms for all the concepts they perceive as being relevant to the areas to be covered by the thesaurus, and also to establish and define terms expressing these concepts that will allow for effective and efficient indexing. Instructions on the use of the terms in the thesaurus should also refer to both components of the indexing process. The effect that thesauri themselves or instructions to indexers on the use of thesauri might have on indexer performance in either of the above components of the indexing process is an area in which more research is needed.

Implications of this Study for Indexing Research

It is hoped that this study will help re-focus the attention of research workers and other personnel in library and information science on the importance of concepts in the process of indexing. Much of the recent research in indexing has concentrated on the grammar, morphology, linguistic, and statistical relationships of terms and not on the concepts represented by the word, phrase, or sentence.

One word can have many shades of meaning; one "meaning" can be characterized by many verbal labels. "Language enters into . . . conceptual representation only in a naming capacity. . . ."[1] This study has shown that there will be

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[1]Roger C. Schank, The Use of Conceptual Relations in Content Analysis and Data Base Storage (Austin, Texas: Tracor, Inc., 1963). (AD 666992).

more agreement on what concepts have been discussed in a text than would be obvious simply from the words used to communicate those concepts. One cannot assume, as some investigators have, that separate words or phrases chosen from the matrix of a sentence will adequately represent the information content of that sentence.

> It is a mistake to assume that a word, or a phrase, contains information in the same sense in which a statement does . . . . the information content of a statement is not the sum, or combination, of the information content of its constituent phrases . . . .[2]

The words or phrases in the sentence, if taken one by one, may result in a different informational "meaning" than if the sentence had been considered as an organic whole with the relationships of the concepts that the words represent still intact.

Although, in many instances, in indexing, we destroy the relationships between concepts in a text when we establish separate terms for each concept, it is still the concept that bears the meaning, not the words used to label the concept.

An example of this is the homograph. For instance, the word "abstract". It can represent many different concepts:

1. A theoretical, non-pragmatic, or non-concrete entity;
2. An abstruse entity not easily understood;

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[2]Y. Bar-Hillel, "A Logician's Reaction to Recent Theorizing on Information Search Systems," American Documentation VIII (April 1957): 105-6.

3. A statement summarizing the important points of a given text;

4. The concentrated essence of a larger whole;

5. An entity thought of or stated without reference to a specific instance or application;

6. A genre of painting.

The form of the word "abstract" (its spelling) does not change with the change in meaning.

Therefore, in addition to research on the frequency or structure of the physical word, phrase, or sentence, it would seem that research on the concept, the indexable concept, should be pursued.

What distinguishes an indexable concept from a non-indexable concept? How do indexers perceive indexable matter? Can the concept "an indexable concept" be defined? Can it be defined in the abstract or may it only be defined in the context of an actual indexing situation?

Can rules and definitions be established that will act as guidelines to indexers in the choice of indexable matter and will these rules make indexers more consistent (predictable) in the kinds of concepts they perceive as indexable?

All of these questions have been posed before. The investigation reported here makes clearer the potential value of such studies.

Implications of this Study for Tests of Indexing Language and Indexing System Effectiveness and Efficiency

Tests and comparisons of indexing systems like those in the Cleverdon studies[3], those reported in Lancaster and Mills[4], J.A. Schuller's study[5], or some of the more recent studies evaluating published indexes reported by Lancaster and Gillespie[6], seem to show that indexing systems differ in effectiveness or efficiency by a comparatively small degree. If this finding is provisionally accepted as fact, is it not reasonable to suppose that inter-indexer inconsistency in perception of concepts, in conjunction with the already recognized phenomenon of inter-indexer inconsistency in terminology would have an effect great enough to influence these results significantly?

It is interesting to note that Cleverdon clearly recognized the indexing process as being composed of the two steps that form the basis for this study. He states, of the

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[3]Cyril Cleverdon, ASLIB Cranfield Research Project: Report on the Testing and Analysis of an Investigation into the Comparative Efficiency of Indexing Systems (Cranfield, England: College of Aeronautics, October 1962)

[4]F.W. Lancaster and J. Mills, "Testing Indexes and Index Language Devices: the ASLIB Cranfield Project," American Documentation XV (January 1964): 4-13.

[5]J.A. Schuller, "Experience with Indexing and Retrieving by UDC and Uniterms," ASLIB Proceedings XII (November 1960): 372-89.

[6]F.W. Lancaster and C.J. Gillespie, "Design and Evaluation of Information Systems," Annual Review of Information Science and Technology, V (1970): 53-57.

second step of the indexing process,"if the concept is correctly translated into the descriptor language, it is capable of being retrieved whatever descriptor language is used."[7]

Cleverdon was testing the "operating efficiency" of the indexing systems he investigated. He did not intend to concern himself with the first part of the indexing process (perception of concepts). However, because of the gross statistical differences found in the study reported on here between indexer consistency in perception of concepts and overall indexer consistency as expressed in consistency in terminology, it would seem necessary that future tests of indexing systems should consciously include indexer perception of concepts as one of the variables in the investigation. Certainly the differences between the retrieval capabilities of the systems Cleverdon studied were statistically small and might have been significantly different if indexer consistency had been one of the variables in the study.

Implications of this Study for the Improvement of Indexing Methodology

The most important implication of this study is that the indexing process is indeed a two part, order-dependent process. It is possible to distinguish between these parts and examine each independently of the other. Since they are order-dependent, the first step, the identification of indexable concepts, provides the foundation on which the second

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[7]Cleverdon, op. cit., p. 97.

step, the choice of terminology, rests. It is possible to improve the level of consistency for the second step without improving the level of consistency of the first step. However, improvement of the level of consistency in the first step would have the effect of raising the attainable level of consistency for both steps. Since these two steps are order-dependent, the level of consistency of the second step, the choice of terminology, can not be higher than the level of consistency of the first step, the perception of indexable matter. At best, they may be equal.

If we could be sure that indexers would display perfect consistency in their choice of terminology (100% consistency in choice of terminology) the overall consistency with which they could assign index terms to a given text would still depend on the consistency with which they perceived the indexable concepts in that text. For example, hypothetically, let us say that for a given text, there are 20 indexable concepts that might be perceived by an indexer. If indexer A perceived concepts 1-10 and indexer B perceived concepts 11-20, the inter-indexer consistency in perception of concepts would be 0.0% although each would have perceived 50.0% of the concepts in the text. Their consistency in terminology would likewise probably be 0.0% since they would not be characterizing the same concepts.

Now, let us suppose, that of the 20 possible indexable concepts in the text, indexer A perceives 15 and indexer B perceives 15. They each perceive concepts 1-10 but in

addition, indexer A perceives concepts 11-15 and indexer B perceives concepts 16-20. Using the formula for concept consistency described in Chapter III of this study, the inter-indexer consistency in choice of concept would be 10/20 or 50.0%. If indexer A and indexer B each used the same terms to label the concepts they had perceived in common, the inter-indexer level of consistency in choice of terminology for the text could still only reach 50.0% since there would always remain the 50% of the concepts in the text that had been perceived by one but not the other.

If, however, they had attained 75.0% inter-indexer consistency in perception of concepts, that is, each had perceived concepts 1-15, but indexer A had additionally perceived concepts 16-18 and indexer B had perceived concepts 19-20, the attainable level of consistency in choice of terminology would likewise have been raised to 75.0%. This is one reason why more research on indexer perception of concepts in texts is necessary. Raising the level of step one raises, by definition, the attainable level for step two.

There is another aspect to this problem that deserves mention here, also. Let us again suppose a hypothetical situation in which there are 20 indexable concepts in a given text. Let us suppose that indexer A perceives concepts 1-10 and indexer B also perceives concepts 1-10. They are 100% consistent in their perception of indexable matter. Let us also suppose that indexer A and indexer B each choose "matching terms" to characterize the concepts they perceive. They

have achieved 100% consistency in terminology. However, there remains 50% of the possible indexable concepts in the text, concepts 11-20, that have been neither perceived nor expressed by these indexers. They would not have provided index access points for concepts 11-20. A concept that is not perceived as indexable can not, by definition, be assigned an index term.

A user requiring information on concepts 11-20 would have no way of knowing that this text contained information on them. The attainable level of indexer-user consistency (an area not investigated in this study) could not be higher than 50.0% even though inter-indexer consistency would be 100%. If indexer consistency in perception of concept could be raised, it may be assumed that attainable indexer-user consistency would be improved as well.

The problem of inter-indexer, intra-indexer, and indexer-user consistency in the perception of concepts in texts is a problem that is still relatively unexplored. This may be because the problem of indexer consistency has not before been overtly separated for study into its two components, consistency in perception of concept and consistency in choice of terminology.

APPENDIX A

LIST OF PREVIOUS INDEXER CONSISTENCY STUDIES

PREVIOUS INDEXER CONSISTENCY STUDIES

Borko, Harold. "Measuring the Reliability of Subject Classification by Men and Machines." American Documentation, XV (October, 1964): 268-73.

Bryant, E. C. Control of Indexing Errors. Denver: Westat Research Analysts, Inc., 1965.

_____, King, D. W., and Terragno, P. J. Analysis of an Indexing and Retrieval Experiment for the Organometallic File of the U.S. Patent Office. Denver: Westat Research Analysts, Inc., 1963.

Cooper, William S. "Is Interindexer Consistency A Hobgoblin?" American Documentation, XX (July, 1969): 268-78.

Harris, D., Rayward, W. B., and Svenonius, E. The Testing of Inter-Indexing Consistency at Various Indexing Depths. Chicago: University of Chicago Graduate Library School, February, 1966.

Hooper, R. S. Indexer Consistency Tests -- Origin, Measurements, Results and Utilization. Bethesda, Md.: IBM Corporation, 1965.

Hurwitz, F. I. "Study of Indexer Consistency." American Documentation, XX (January, 1969): 92-4.

Jacoby, J., and Slamecka, V. Indexer Consistency Under Minimal Conditions. Bethesda, Md.: Documentation, Inc., 1962. (AD 288087).

Jaster, J. J., Murray, B. R., and Taube, M. State of the Art of Co-ordinate Indexing. Washington, D.C.: Documentation, Inc., 1962. (AD 275393).

Korotkin, A. L., and Oliver, L. H. The Effect of Subject Familiarity and the Use of an Indexing Aid Upon Inter-Indexer Consistency. Bethesda, Md.: General Electric Co., 1966.

_____, and _____. A Method for Computing Indexer Consistency. Bethesda, Md.: General Electric Co., 1964.

_____, Oliver, L. H., and Burgis, D. R. Indexing Aids, Procedures, and Devices. Bethesda, Md.: General Electric Co., 1965.

Kyle, Barbara. Consistency Analysis of Two Indexers Using K. C. for political Science Material. London: National Book League, 1962.

Macmillan, J. T., and Welt, I. D. "A Study of Indexing Procedures in a Limited Area of the Medical Sciences." American Documentation, XII (January, 1961): 27-31.

Mullison, W. R. and others. "Comparing Indexing Efficiency, Effectiveness, and Consistency With or Without the Use of Roles." In American Society for Information Science. Proceedings. Vol. VI. Westport, Conn.: Greenwood, 1969.

Painter, Ann F. Analysis of Duplication and Consistency of Subject Indexing Involved in Report Handling at the Office of Technical Services, U.S. Department of Commerce. Washington, D.C.: U.S. Office of Technical Services, Department of Commerce, 1963. (PB 181501).

Rayward, W. B., and Svenonius, E. Consistency, Consensus Sets and Random Deletion. Chicago: University of Chicago Graduate Library School, 1967.

Rodgers, D. J. A Study of Inter-Indexer Consistency. Washington, D.C.: General Electric Company, 1961.

_____, A Study of Intra-Indexer Consistency. Washington, D.C.: General Electric Company, 1961.

St. Laurent, Mary Cuddy. A Review of the Literature of Indexer Consistency. Chicago: University of Chicago Graduate Library School, 1966.

Saracevic, T. and others. An Inquiry into Testing of Information Retrieval Systems. Part 1: Objectives, Methodology, Design, and Controls. Cleveland, Ohio: Case Western Reserve University Center for Documentation and Communication Research, 1968.

Slamecka, V., and Jacoby, J. Effect of Indexing Aids on the Reliability of Indexers. Bethesda, Md.: Documentation, Inc., 1963.

Tell, B. V. "Document Representation and Indexer Consistency; a Study of Indexing from Titles, Abstracts, and Full Text Using UDC and Keywords." In American Society for Information Science. Proceedings. Vol. VI. Westport, Conn.: Greenwood, 1969.

Tinker, John F. "Imprecision in Indexing, Part II." American Documentation, IXX (July, 1968): 322-30.

_____, Imprecision in Meaning Measured by Inconsistency of Indexing." American Documentation, XVII (April, 1966): 96-102.

Zunde, Pranas, and Dexter, M. E. "Indexing Consistency and Quality." American Documentation, XX (July, 1969): 259-67.

_____, and Dexter, M. E. "Factors Affecting Indexing Performance." In American Society for Information Science. Proceedings. Vol. VI. Westport, Conn.: Greenwood, 1969.

APPENDIX B

BIOGRAPHICAL INFORMATION ON ANALYSTS

BIOGRAPHICAL INFORMATION ON ANALYSTS

ANALYST'S NAME: _____

EDUCATION: (Please check all that apply.)

Master's degree in library science ____

Master's degree in other subject field ____

Doctoral degree in other subject field ____

Bachelor's degree only ____

Undegraduate major study area was _____

Graduate study was in the area of _____

Is this your first semester in library school? Yes ____,
No ____.

WORK EXPERIENCE: (Please check all that apply.)

Have you worked in a library or done library-related or "library type" work? Yes ____, No ____.

If yes, how many years? Less than 1 ____, 1-3 ____,
4 or more ____.

What did the work involve?

Mainly clerical tasks ____

Reference ____

Cataloging and/or classification ____

Administration ____

Teaching ____

Research ____

Subject analysis of written material ____

Acquisitions ____

Automation ____

Circulation ____

Indexing ____

Abstracting ____

Other ____ (Please specify.)

APPENDIX C

INSTRUCTIONS FOR ANALYSTS

INSTRUCTIONS FOR ANALYSTS

For the purposes of this study, you will be given various journal articles to read. After you read each article, you will be asked to identify the concepts discussed in the article and write the name of the concept on a data gathering sheet.

Imagine that you are analyzing the article for an information center and library containing material on information science, documentation and librarianship.

What you are being asked to do is to identify concepts in the article and write them down by name in the words you would ordinarily use to name the concept. They do not have to be the words used by the author. They do not have to conform to any established indexing language or system of subject headings. They should be words or phrases that you would use to identify the concepts in the article. For convenience, I call these words or phrases "verbal labels." Verbal labels define a concept in words. Your objective should be to name all the concepts in each article on which useful information is given.

Each verbal label should identify one concept only.

Each concept should be characterized by a separate verbal label.

Each verbal label should reflect the exact concept in the article. For instance, if the article is about "Airedales", you would use the verbal label "Airedales", not the verbal label "Dogs."

Many people feel it is possible to analyze an article for concepts without being able to understand everything written in the article. In other words, you may be able to indicate what concepts are being discussed in an article without knowing what is being said <u>about</u> the article whether or not you understand what is being said about the concepts. Of course, if you do not understand what concepts are being discussed, you may leave the data gathering sheet blank. Please be sure to indicate on the bottom of the data gathering sheet whether you understand the article completely, in part, or not at all.

Please do not write on the articles. Write on the data gathering sheets.

APPENDIX D

DATA GATHERING SHEET VERBAL LABELS FOR ARTICLES

DATA GATHERING SHEET

VERBAL LABELS FOR ARTICLES

Analyst's name: _____

Journal article number: _____

Subject labels:

Please check one:

I understood this article completely ____, in part ____,

not at all ____.

APPENDIX E

INSTRUCTIONS FOR CATEGORIZATION

INSTRUCTIONS FOR CATEGORIZATION

Place the five data gathering sheets for an article in a folder. Label the folder with the number of the article.

Read the first verbal label of the first analyst.

Decide what concept categories need to be established for the concept(s) in the first verbal label. Establish them and write them out on the inside of the folder, for example:

A Circulation systems

B Mechanization

Call these concept categories "A", "B", "C", etc., in order, with no attempt to establish relationships between them.

Read all the verbal labels created by all the analysts for the article. Decide which verbal labels, if any, contain concepts that might be placed under category "A" and write "A" next to these verbal labels. Do the same for category "B", "C", "D", etc., creating new concept categories where necessary and returning to search previously searched verbal labels when a new category has been established.

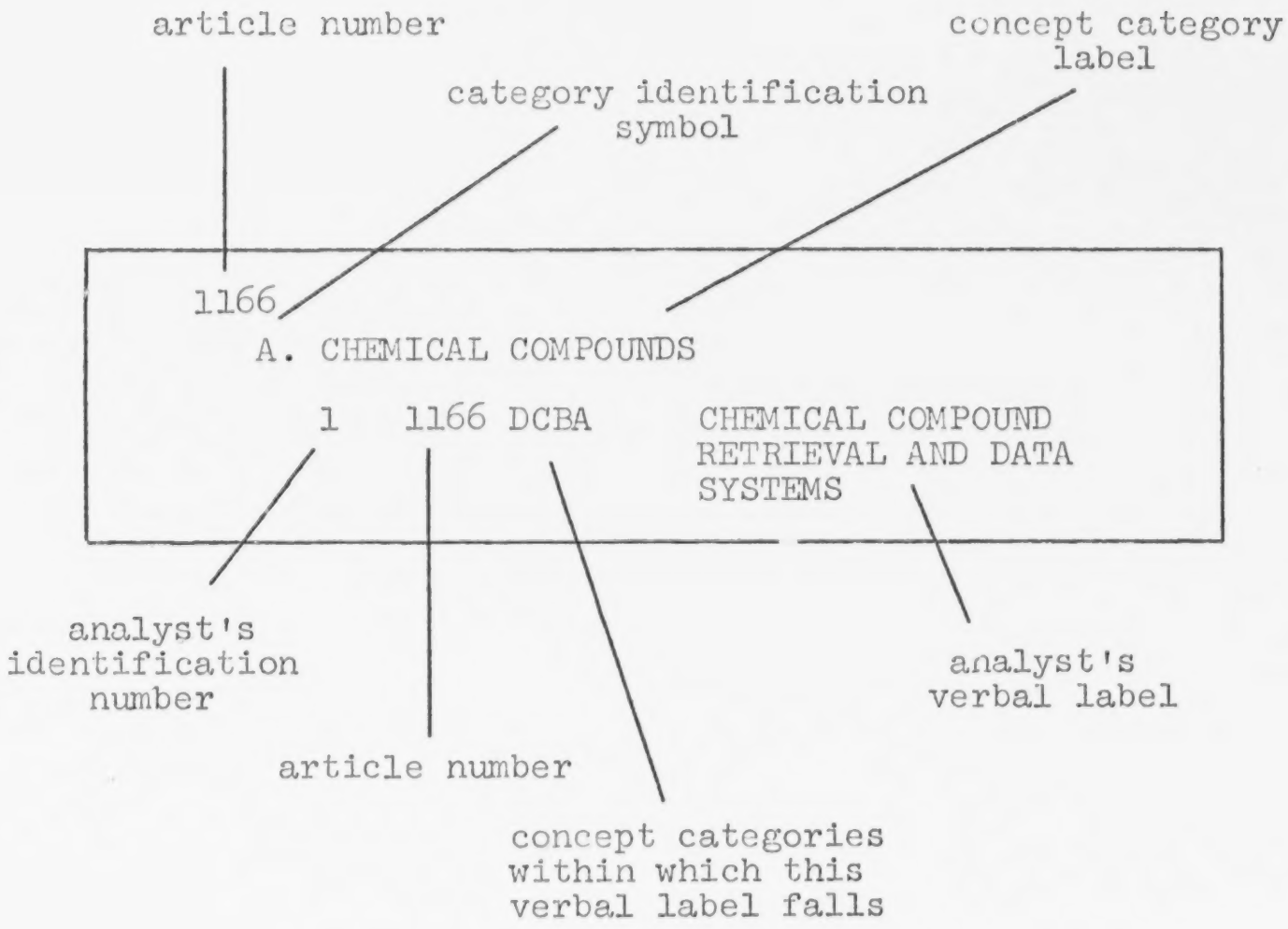
Proceed until all concepts in all of the verbal labels for all of the analysts for the article have been

given category labels and all verbal labels have been searched for all concept categories.

APPENDIX F

PRINT-OUT OF CONCEPT CATEGORIZATION FOR TEN ARTICLES

EXPLANATION OF FORMATION OF PRINT-OUT



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1166

A. CHEMICAL COMPOUNDS

1	1166 DCBA	CHEMICAL COMPOUND RETRIEVAL AND DATA SYSTEMS

B. RETRIEVAL SYSTEMS

1	1166 DCBA	CHEMICAL COMPOUND RETRIEVAL AND DATA SYSTEMS
1	1166 KBJHI	LIFE SCIENCES RESEARCH AREA OF STANFORD RESEARCH INSTITU TE'S INFORMATION STORAGE AND RETRIEVAL SYSTEM FOR CHEM STRUCTURES
1	1166 MKB	RETRIEVAL SYSTEM FOR SMALL COLLECTIONS OF CHEMICAL STRUCTURES
3	1166 BK	CHEMICAL STRUCTURE RETRIEVAL SYSTEMS

C. DATA SYSTEMS

1	1166 DCBA	CHEMICAL COMPOUND RETRIEVAL AND DATA SYSTEMS
3	1166 JDC	CHEMICAL DATA STORAGE
3	1166 CSUKM	SMALL COLLECTIONS OF CHEMICAL STRUCTURES, COST OF AUTOMATED DATA

	3	1166 RFDE	PERMUTED CHEMICAL LINE NOTATIONS
	3	1166 XRE	PERMUTED NOTATION PROGRAMS
	8	1166 ESRD	CHEMICAL NOTATION, MACHINE PERMUTING OF
	8	1166 UYERD	CHEMICAL NOTATIONS, PERMUTED, TIME-COST DATA
	8	1166 NEH	SRI PERMUTED INDEX, USE OF

F. LINE NOTATIONS

1	1166 RGFDE	PERMUTED CHEMICAL LINE NOTATIONS IN TABULATED LISTS
1	1166 RFL	WISWESSER LINE NOTATION
4	1166 RFSL	WISWESSER LINE NOTATION, STUDY OF AUTOMATION
4	1166 DQRFE	PERMUTED LINE NOTATION IN ORGANIC CHEMISTRY
2	1166 RF	LINE NOTATION
3	1166 RFDE	PERMUTED CHEMICAL LINE NOTATIONS
3	1166 RFL	WISWESSER LINE NOTATION SYSTEM

G. TABULATED LISTS

1	1166 RGFDE	PERMUTED CHEMICAL LINE NOTATIONS IN TABULATED LISTS

H. STANFORD RESEARCH INSTITUTE

1	1166	KBJHI	LIFE SCIENCES RESEARCH AREA OF STANFORD RESEARCH INSTITU TE'S INFORMATION STORAGE AND RETRIEVAL SYSTEM FOR CHEM STRUCTURES
1	1166	NEH	SRI PERMUTED INDEX
2	1166	H	STANFORD RESEARCH INSTITUTE
3	1166	SKQH	STANFORD RESEARCH INSTITUTE, ORGANIC STRUCTURE FILE AUTOMATION
8	1166	NEH	SRI PERMUTED INDEX, USE OF

I. LIFE SCIENCES RESEARCH AREA OF SRI

1	1166	KBJHI	LIFE SCIENCES RESEARCH AREA OF STANFORD RESEARCH INSTITU TE'S INFORMATION STORAGE AND RETRIEVAL SYSTEM FOR CHEM STRUCTURES

J. INFORMATION STORAGE AND RETRIEVAL SYSTEMS

1	1166	KBJHI	LIFE SCIENCES RESEARCH AREA OF STANFORD RESEARCH INSTITU TE'S INFORMATION STORAGE AND RETRIEVAL SYSTEM FOR CHEM STRUCTURES
2	1166	J	COLLECTING & STORING
3	1166	JDC	CHEMICAL DATA STORAGE

	3	1166 RFDE	PERMUTED CHEMICAL LINE NOTATIONS
	3	1166 XRE	PERMUTED NOTATION PROGRAMS
	8	1166 ESRD	CHEMICAL NOTATION, MACHINE PERMUTING OF
	8	1166 UYERD	CHEMICAL NOTATIONS, PERMUTED, TIME-COST DATA
	8	1166 NEH	SRI PERMUTED INDEX, USE OF
F.	LINE NOTATIONS		
	1	1166 RGFDE	PERMUTED CHEMICAL LINE NOTATIONS IN TABULATED LISTS
	1	1166 RFL	WISWESSER LINE NOTATION
	4	1166 RFSL	WISWESSER LINE NOTATION, STUDY OF AUTOMATION
	4	1166 DQRFE	PERMUTED LINE NOTATION IN ORGANIC CHEMISTRY
	2	1166 RF	LINE NOTATION
	3	1166 RFDE	PERMUTED CHEMICAL LINE NOTATIONS
	3	1166 RFL	WISWESSER LINE NOTATION SYSTEM
G.	TABULATED LISTS		
	1	1166 RGFDE	PERMUTED CHEMICAL LINE NOTATIONS IN TABULATED LISTS

K. CHEMICAL STRUCTURES

1	1166	KBJHI	LIFE SCIENCES RESEARCH AREA OF STANFORD RESEARCH INSTITU TE'S INFORMATION STORAGE AND RETRIEVAL SYSTEM FOR CHEM STRUCTURES
1	1166	MKB	RETRIEVAL SYSTEM FOR SMALL COLLECTIONS OF CHEMICAL STRUCTURES
2	1166	K	CHEMICAL STRUCTURES
3	1166	BK	CHEMICAL STRUCTURE RETRIEVAL SYSTEMS
3	1166	CSUKM	SMALL COLLECTIONS OF CHEMICAL STRUCTURES, COST OF AUTOMATED DATA
3	1166	SKQH	STANFORD RESEARCH INSTITUTE, ORGANIC STRUCTURE FILE AUTOMATION
8	1166	NK	CHEMICAL STRUCTURES, COMPUTER INDEX OF

L. WISWESSER NOTATION

1	1166	RFL	WISWESSER LINE NOTATION
4	1166	RFSL	WISWESSER LINE NOTATION, STUDY OF AUTOMATION
2	1166	RL	WISWESSER NOTATION
3	1166	RFL	WISWESSER LINE NOTATION SYSTEM
8	1166	RL	WISWESSER NOTATION

M. SMALL COLLECTIONS

1	1166	MKB	RETRIEVAL SYSTEM FOR SMALL COLLECTIONS OF CHEMICAL STRUCTURES
2	1166	M	SMALL COLLECTION.
3	1166	CSUKM	SMALL COLLECTIONS OF CHEMICAL STRUCTURES, COST OF AUTOMATED DATA

N. INDEX

1	1166	NEH	SRI PERMUTED INDEX
4	1166	TNEQDSP	SCIENCE INFORMATION, AUTOMATION, CHEMISTRY, ORGANIC, PERMUTED INDEX - STUDY. 1966
8	1166	NK	CHEMICAL STRUCTURES, COMPUTER INDEX OF
8	1166	NEH	SRI PERMUTED INDEX, USE OF

O. CHEMICAL NOTATION ASSOCIATION

1	1166	O	CHEMICAL NOTATION ASSOCIATION

P. SCIENCE INFORMATION

4	1166	RODP	SCIENCE INFORMATION, CHEMISTRY, ORGANIC, NOTATION SYSTEMS
4	1166	TNEQDSP	SCIENCE INFORMATION, AUTOMATION, CHEMISTRY, ORGANIC, PERMUTED INDEX - STUDY. 1966

Q. ORGANIC

4	1166 RQDP	SCIENCE INFORMATION, CHEMISTRY, ORGANIC, NOTATION SYSTEMS
4	1166 DQRFE	PERMUTED LINE NOTATION IN ORGANIC CHEMISTRY
4	1166 TNEQDSP	SCIENCE INFORMATION, AUTOMATION, CHEMISTRY, ORGANIC, PERMUTED INDEX - STUDY. 1966
3	1166 SKQH	STANFORD RESEARCH INSTITUTE, ORGANIC STRUCTURE FILE AUTOMATION

R. NOTATION SYSTEMS

1	1166 RGFDE	PERMUTED CHEMICAL LINE NOTATIONS IN TABULATED LISTS
1	1166 RFL	WISWESSER LINE NOTATION
4	1166 RQDP	SCIENCE INFORMATION, CHEMISTRY, ORGANIC, NOTATION SYSTEMS
4	1166 RFSL	WISWESSER LINE NOTATION, STUDY OF AUTOMATION
4	1166 DQRFE	PERMUTED LINE NOTATION IN ORGANIC CHEMISTRY
2	1166 RL	WISWESSER NOTATION
2	1166 RF	LINE NOTATION
3	1166 RFDE	PERMUTED CHEMICAL LINE NOTATIONS
3	1166 RFL	WISWESSER LINE NOTATION SYSTEM
3	1166 XRE	PERMUTED NOTATION PROGRAMS
8	1166 ESRD	CHEMICAL NOTATION, MACHINE PERMUTING OF

	8	1166 UYERD	CHEMICAL NOTATIONS, PERMUTED, TIME-COST DATA
	8	1166 RL	WISWESSER NOTATION

S. AUTOMATION

	4	1166 RFSL	WISWESSER LINE NOTATION, STUDY OF AUTOMATION
	4	1166 TNEODSP	SCIENCE INFORMATION, AUTOMATION, CHEMISTRY, ORGANIC, PERMUTED INDEX - STUDY. 1966
	2	1166 S	AUTOMATED
	3	1166 CSUKM	SMALL COLLECTIONS OF CHEMICAL STRUCTURES, COST OF AUTOMATED DATA
	3	1166 SKQH	STANFORD RESEARCH INSTITUTE, ORGANIC STRUCTURE FILE AUTOMATION
	8	1166 ESRD	CHEMICAL NOTATION, MACHINE PERMUTING OF

T. 1966

	4	1166 TNEODSP	SCIENCE INFORMATION, AUTOMATION, CHEMISTRY, ORGANIC, PERMUTED INDEX - STUDY. 1966

U. COSTS

	2	1166 U	COSTS
	3	1166 CSUKM	SMALL COLLECTIONS OF CHEMICAL STRUCTURES, COST OF AUTOMATED DATA
	8	1166 UYERD	CHEMICAL NOTATIONS, PERMUTED, TIME-COST DATA

V. FORMULA REGENERATION

2	1166 V	FORMULA REGENERATION

W. BROWSING

2	1166 W	BROWSING

X. PROGRAMS

2	1166 X	PROGRAMS
3	1166 XRE	PERMUTED NOTATION PROGRAMS

Y. TIMES

2	1166 Y	TIMES
8	1166 UYERD	CHEMICAL NOTATIONS, PERMUTED, TIME-COST DATA

Z. SEARCHING

2	1166 Z	SEARCHING

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1172

A. PATENT SYSTEM

14	1172 A	PATENT SYSTEM
7	1172 EA	COMMISSION ON THE PATENT SYSTEM
7	1172 FEA	COMMISION ON THE PATENT SYSTEM, MEMBERS

7	1172 GEA	COMMISION ON THE PATENT SYSTEM, RECOMMENDATIONS OF
3	1172 ICA	U.S. PATENT SYSTEM, ADVANTAGES AND DISADVANTAGES
3	1172 GEA	PRESIDENT'S COMMITTEE ON THE PATENT SYSTEM, REPORT, SUMMARY
3	1172 KA	"FIRST TO FILE" SYSTEM OF PATENTS
8	1172 GEA	REPORT OF THE PRESIDENT'S COMMUSSION ON THE PATENT SYSTEM
8	1172 KDCA	U.S. PATENT SYSTEM PROPOSED REFORMS, "FIRST TO FILE" SYSTEM
8	1172 LDCA	U.S. PATENT SYSTEM, PROPOSED REFORMS, PATENT QUALITY IMPROVED
8	1172 MDCA	U.S. PATENT SYSTEM, PROPOSED REFORMS, OFFICE OF CIVIL COMMISSIONER FOR LITIGATION
8	1172 NDCA	U.S. PATENT SYSTEM, PROPOSED REORMS, REDUCING COSTS
8	1172 HDCA	U.S. PATENT SYSTEM, PROPOSED REORMS, UNIVERSAL PATENT SYSTEM
13	1172 ECA	U.S. PRESIDENT'S COMMISSSION ON THE PATENT SYSTEM

B. PATENT OFFICE

7	1172 CB	U.S. PATENT OFFICE
7	1172 DB	PATENTS-REVISION OF THE OFFICE OF
13	1172 B	PATENT OFFICE

C. UNITED STATES

7	1172 CB	U.S. PATENT OFFICE
3	1172 ICA	U.S. PATENT SYSTEM, ADVANTAGES AND DISADVANTAGES
8	1172 KDCA	U.S. PATENT SYSTEM PROPOSED REFORMS, "FIRST TO FILE" SYSTEM
8	1172 LDCA	U.S. PATENT SYSTEM, PROPOSED REFORMS, PATENT QUALITY IMPROVED
8	1172 MDCA	U.S. PATENT SYSTEM, PROPOSED REFORMS, OFFICE OF CIVIL COMMISSIONER FOR LITIGATION
8	1172 NDCA	U.S. PATENT SYSTEM, PROPOSED REORMS, REDUCING COSTS
8	1172 HDCA	U.S. PATENT SYSTEM, PROPOSED REORMS, UNIVERSAL PATENT SYSTEM
13	1172 ECA	U.S. PRESIDENT'S COMMISSSION ON THE PATENT SYSTEM

D. REVISION (REFORM) OF THE PATENT OFFICE (PATENT SYSTEM)

7	1172 DB	PATENTS-REVISION OF THE OFFICE OF
8	1172 KDCA	U.S. PATENT SYSTEM PROPOSED REFORMS, "FIRST TO FILE" SYSTEM
8	1172 LDCA	U.S. PATENT SYSTEM, PROPOSED REFORMS, PATENT QUALITY IMPROVED

	8	1172 MDCA	U.S. PATENT SYSTEM, PROPOSED REFORMS, OFFICE OF CIVIL COMMISSIONER FOR LITIGATION
	8	1172 NDCA	U.S. PATENT SYSTEM, PROPOSED REORMS, REDUCING COSTS
	8	1172 HDCA	U.S. PATENT SYSTEM, PROPOSED REORMS, UNIVERSAL PATENT SYSTEM
	13	1172 GD	PATENTS, RECOMMENDED REFORMS

E. COMMISSION ON THE PATENT SYSTEM
(PRESICENT'S COMMISSION)

7	1172 EA	COMMISSION ON THE PATENT SYSTEM
7	1172 FEA	COMMISION ON THE PATENT SYSTEM, MEMBERS
7	1172 GEA	COMMISION ON THE PATENT SYSTEM, RECOMMENDATIONS OF
3	1172 GEA	PRESIDENT'S COMMITTEE ON THE PATENT SYSTEM, REPORT, SUMMARY
8	1172 GEA	REPORT OF THE PRESIDENT'S COMMUSSION ON THE PATENT SYSTEM
13	1172 ECA	U.S. PRESIDENT'S COMMISSSION ON THE PATENT SYSTEM

F. MEMBERS

7	1172 FEA	COMMISION ON THE PATENT SYSTEM, MEMBERS

G. RECOMMENDATIONS (REPORT)

7	1172 GEA	COMMISION ON THE PATENT SYSTEM, RECOMMENDATIONS OF
3	1172 GEA	PRESIDENT'S COMMITTEE ON THE PATENT SYSTEM, REPORT, SUMMARY
8	1172 GEA	REPORT OF THE PRESIDENT'S COMMUSSION ON THE PATENT SYSTEM
13	1172 GD	PATENTS, RECOMMENDED REFORMS

H. UNIVERSAL PATENTS

7	1172 H	PATENTS, UNIVERSAL
8	1172 HDCA	U.S. PATENT SYSTEM, PROPOSED REORMS, UNIVERSAL PATENT SYSTEM
13	1172 H	UNIVERSAL PATENT

I. ADVANTAGES AND DISADVANTAGES

3	1172 ICA	U.S. PATENT SYSTEM, ADVANTAGES AND DISADVANTAGES

J. PATENT DELAYS

3	1172 J	PATENTS, DELAYS

K. "FIRST TO FILE" SYSTEM

3	1172 KA	"FIRST TO FILE" SYSTEM OF PATENTS
8	1172 KDCA	U.S. PATENT SYSTEM PROPOSED REFORMS, "FIRST TO FILE" SYSTEM

L. IMPROVEMENT OF PATENT QUALITY

8	1172 LDCA	U.S. PATENT SYSTEM, PROPOSED REFORMS, PATENT QUALITY IMPROVED

M. OFFICE OF CIVIL COMMISSION FOR LITIGATION

8	1172 MDCA	U.S. PATENT SYSTEM, PROPOSED REFORMS, OFFICE OF CIVIL COMMISSIONER FOR LITIGATION

N. COSTS

8	1172 NDCA	U.S. PATENT SYSTEM, PROPOSED REORMS, REDUCING COSTS

****

1183

A. SELECTIVE DISSEMINATION OF INFORMATION

14	1183 A	SELECTIVE DISSEMINATION OF INFORMATION
7	1183 BA	SELECTIVE DISSEMINATION OF INFORMATION, RESEARCH AND DEVELOPMENT

7	1183 CA	TECHNICAL INFORMATION CENTER, SDI IN
7	1183 DA	SPECIAL LIBRARY, SDI IN
3	1183 HGA	SDI FROM TITLES, STUDY AT AWRE LIBRARY
8	1183 JIHGA	SDI PACKAGE USING CHEMCIAL TITLES IN UK AT AWRE
13	1183 IHA	CHEMICAL TITLES, SDI
13	1183 GA	SDI AT AWRE

B. RESEARCH AND DEVELOPMENT

7	1183 BA	SELECTIVE DISSEMINATION OF INFORMATION, RESEARCH AND DEVELOPMENT

C. TECHNICAL INFORMATION CENTER

7	1183 CA	TECHNICAL INFORMATION CENTER, SDI IN

D. SPECIAL LIBRARY

7	1183 DA	SPECIAL LIBRARY, SDI IN

E. INFORMATION RETRIEVAL

7	1183 E	INFORMATION RETRIEVAL
7	1183 FE	CHEMICAL ABSTRACTS SERVICE, RETRIEVAL PROGRAMS

F. CHEMICAL ABSTRACTS SERVICE

7	1183	FE	CHEMICAL ABSTRACTS SERVICE, RETRIEVAL PROGRAMS

G. ATOMIC WEAPONS RESEARCH ESTABLISHMENT (AWRE; AWRE LIBRARY)

3	1183	HGA	SDI FROM TITLES, STUDY AT AWRE LIBRARY
8	1183	JIHGA	SDI PACKAGE USING CHEMCIAL TITLES IN UK AT AWRE
13	1183	G	AWRE LIBRARY
13	1183	GA	SDI AT AWRE

H. SDI USING TITLES

3	1183	HGA	SDI FROM TITLES, STUDY AT AWRE LIBRARY
8	1183	JIHGA	SDI PACKAGE USING CHEMCIAL TITLES IN UK AT AWRE
13	1183	IHA	CHEMICAL TITLES, SDI

I. CHEMICAL TITLES

8	1183	JIHGA	SDI PACKAGE USING CHEMCIAL TITLES IN UK AT AWRE
13	1183	IHA	CHEMICAL TITLES, SDI

J. UNITED KINGDOM

8	1183 JIHGA	SDI PACKAGE USING CHEMCIAL TITLES IN UK AT AWRE

K. CHEMICAL SOCIETY, DOCUMENTATION RESEARCH UNIT

13	1183 K	CHEMICAL SOCIETY'S DOCUMENTATION RESEARCH UNIT

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1205

A. FAIR PROJECT

6	1205 A	FAIR (FAST ACCESS INFORMATION RETRIEVAL) PROJECT
5	1205 MA	FAIR PROJECT-METHODS
11	1205 A	FAIR PROJECT
11	1205 DFA	DEFINITION OF TERMS IN FAIR CONTEXT
2	1205 A	FAST ACCESS INFO. RETRIEVAL (FAIR)
13	1205 VA	FAIR (FAST ACCESS INFORMATION RETRIEVAL) PROJECT, GREAT BRITAIN

B. INDEXING; INFORMATION INDEXING; INDEXES

6	1205 B	INFORMATION INDEXING
6	1205 GB	BIOMEDICAL ENGINEERING-INFORMATION INDEXING

6	1205 IB	INDEXING BY SUBJECT PRACTITIONERS
6	1205 IGB	BIOMEDICAL ENGINEERING-INDEXING BY SUBJECT PRACTITIONERS
6	1205 KJB	LARGE PERSONAL SUBJECT LIBRARIES ON MICROFORMS-INDEXES
6	1205 FMDB	INDEXING-INSTRUCTIONS FOR ASSIGNING DESCRIPTORS
6	1205 NCB	INFORMATION INDEXING & RETRIEVAL-BIBLIOGRAPHY
5	1205 DB	INDEXING-DESCRIPTORS
5	1205 EB	INDEXING-THESAURAS
5	1205 PNB	COMPUTER INDEXING-BIBLIOGRAPHY
11	1205 IGB	POSSIBILITIES OF USER INDEXING IN BIOMEDICAL ENGINEERING
2	1205 TB	COOPERATIVE INDEXING
13	1205 LCB	INDEXING, FEATURE CARD INFORMATION RETRIEVAL SYSTEMS
13	1205 LB	INDEX, FEATURE CARD

C. INFORMATION RETRIEVAL

6	1205 C	INFORMATION RETRIEVAL
6	1205 GC	BIOMEDICAL ENGINEERING-INFORMATION RETRIEVAL
6	1205 HC	INFORMATION RETRIEVAL LANGUAGES
6	1205 LC	PEEK-A-BOO CARD INFO. RETRIEVAL SYSTEMS
6	1205 NCB	INFORMATION INDEXING & RETRIEVAL-BIBLIOGRAPHY
5	1205 C	INFORMATION RETRIEVAL SYSTEMS

11	1205 GC	INFORMATION RETRIEVAL IN BIOMEDICAL ENGINEERING
11	1205 HFC	COMPILATION OF AN INFORMATION RETRIEVAL LANGUAGE
2	1205 C	INFO. RETRIEVAL SYSTEMS
13	1205 VC	GREAT BRITAIN, INFORMATION RETRIEVAL
13	1205 HC	INFORMATION RETRIEVAL LANGUAGE
13	1205 C	INFORMATION RETRIEVAL SYSTEM
13	1205 LCB	INDEXING, FEATURE CARD INFORMATION RETRIEVAL SYSTEMS
13	1205 CIF	SCIENTISTS AID IN ESTABLISHING INFORMATION RETRIEVAL SYSTEMS

D. DESCRIPTORS; TERMS

6	1205 FED	LIST OF DESCRIPTORS (THESAURI) GENERATION OF
6	1205 GFD	BIOMEDICAL ENGINEERING-DESCRIPTORS, GENERATION OF
6	1205 FMDB	INDEXING-INSTRUCTIONS FOR ASSIGNING DESCRIPTORS
5	1205 DB	INDEXING-DESCRIPTORS
11	1205 DFA	DEFINITION OF TERMS IN FAIR CONTEXT
2	1205 D	DESCRIPTORS
13	1205 GFD	DESCRIPTORS, DEVELOPMENT EXERIMENT IN BIOMEDICAL ENGINE ERING

E. THESAURI

6	1205 FED	LIST OF DESCRIPTORS (THESAURI) GENERATION OF
5	1205 EB	INDEXING-THESAURAS
2	1205 FE	THESAURUS PRODUCTION
13	1205 E	THESAURUS

F. DEVELOPMENT; ESTABLISHMENT; DEFINITION OF TERMS

6	1205 FED	LIST OF DESCRIPTORS (THESAURI) GENERATION OF
6	1205 GFD	BIOMEDICAL ENGINEERING-DESCRIPTORS, GENERATION OF
6	1205 FMDB	INDEXING-INSTRUCTIONS FOR ASSIGNING DESCRIPTORS
11	1205 DFA	DEFINITION OF TERMS IN FAIR CONTEXT
11	1205 HFC	COMPILATION OF AN INFORMATION RETRIEVAL LANGUAGE
2	1205 FE	THESAURUS PRODUCTION
13	1205 GFD	DESCRIPTORS, DEVELOPMENT EXERIMENT IN BIOMEDICAL ENGINE ERING
13	1205 CIF	SCIENTISTS AID IN ESTABLISHING INFORMATION RETRIEVAL SYSTEMS

G. BIOMEDICAL ENGINEERING

6	1205 GB	BIOMEDICAL ENGINEERING-INFORMATION INDEXING
6	1205 GC	BIOMEDICAL ENGINEERING-INFORMATION RETRIEVAL

6	1205 GFD	BIOMEDICAL ENGINEERING-DESCRIPTORS, GENERATION OF
6	1205 IGB	BIOMEDICAL ENGINEERING-INDEXING BY SUBJECT PRACTITIONERS
5	1205 G	BIOMEDICAL ENGINEERING
11	1205 GC	INFORMATION RETRIEVAL IN BIOMEDICAL ENGINEERING
11	1205 IGB	POSSIBILITIES OF USER INDEXING IN BIOMEDICAL ENGINEERING
2	1205 G	BIOMEDICAL ENGINEERING
13	1205 GFD	DESCRIPTORS, DEVELOPMENT EXERIMENT IN BIOMEDICAL ENGINE ERING

H. LANGUAGES

6	1205 HC	INFORMATION RETRIEVAL LANGUAGES
11	1205 HFC	COMPILATION OF AN INFORMATION RETRIEVAL LANGUAGE
13	1205 HC	INFORMATION RETRIEVAL LANGUAGE

I. SUBJECT PRACTITIONERS; USERS; SCIENTISTS

6	1205 IB	INDEXING BY SUBJECT PRACTITIONERS
6	1205 IGB	BIOMEDICAL ENGINEERING-INDEXING BY SUBJECT PRACTITIONERS

11	1205 IGB	POSSIBILITIES OF USER INDEXING IN BIOMEDICAL ENGINEERING
13	1205 CIF	SCIENTISTS AID IN ESTABLISHING INFORMATION RETRIEVAL SYSTEMS

J. PERSONAL LIBARIES; USE OF LITERATURE

6	1205 KJB	LARGE PERSONAL SUBJECT LIBRARIES ON MICROFORMS-INDEXES
13	1205 J	LIBRARY, SATELLITE
13	1205 KJ	MICROFILM FOR INDIVIDUAL DESK LIBRARY

K. MICROFORMS

6	1205 KJB	LARGE PERSONAL SUBJECT LIBRARIES ON MICROFORMS-INDEXES
13	1205 KJ	MICROFILM FOR INDIVIDUAL DESK LIBRARY

L. PEEK-A-BOO CARD SYSTEM; FEATURE CARD FILE

6	1205 LC	PEEK-A-BOO CARD INFO. RETRIEVAL SYSTEMS
5	1205 L	FEATURE CARD FILE
5	1205 OML	FEATURE CARD FILE-UPDATING METHODS
2	1205 L	PEEK-A-BOO INDEX FILE
13	1205 LCB	INDEXING, FEATURE CARD INFORMATION RETRIEVAL SYSTEMS
13	1205 LB	INDEX, FEATURE CARD

M. METHODS

6	1205 FMDB	INDEXING-INSTRUCTIONS FOR ASSIGNING DESCRIPTORS
5	1205 MA	FAIR PROJECT-METHODS
5	1205 OML	FEATURE CARD FILE-UPDATING METHODS

N. BIBLIOGRAPHY

6	1205 NCB	INFORMATION INDEXING & RETRIEVAL-BIBLIOGRAPHY
5	1205 PNB	COMPUTER INDEXING-BIBLIOGRAPHY

O. UPDATING

5	1205 OML	FEATURE CARD FILE-UPDATING METHODS

P. COMPUTER

5	1205 PNB	COMPUTER INDEXING-BIBLIOGRAPHY

Q. NATIONAL INSTITUTE FOR MEDICAL RESEARCH-DIVISION OF BIOMEDICAL ENGIN.

2	1205 Q	NAT. INSTITUTE FOR MEDICAL RESEARCH-DIV. OF BIOMEDICAL E NGINEERING

R. BIOLOGICAL ENGINEERING SOCIETY

2	1205 R	BIOLOGICAL ENGINEERING SOCIETY

S. HOSPITAL PHYSICISTS ASSOCIATION

2	1205 S	HOSPITAL PHYSICISTS ASSN.

T. COOPERATIVE

2	1205 TB	COOPERATIVE INDEXING

U. MEDICAL RESEARCH COUNCIL-COMPUTER SERVICES CENTER

2	1205 U	MEDICAL RESEARCH COUNCIL-COMPUTER SERVICES CENTER

V. GREAT BRITAIN

13	1205 VC	GREAT BRITAIN, INFORMATION RETRIEVAL
13	1205 VA	FAIR (FAST ACCESS INFORMATION RETRIEVAL) PROJECT, GREAT BRITAIN

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1237

A. PHOTOCOPYING

14	1237 AB	PHOTOCOPYING COSTS
7	1237 EBAD	LIBRARY PHOTOCOPYING, COSTS, ACCOUNTING
7	1237 FBAD	LIBRARY PHOTOCOPYING, COSTS, INDIRECT
3	1237 BAD	LIBRARY PHOTOCOPYING COSTS
8	1237 IFBA	PHOTOCOPYING, DIRECT AND INDIRECT COSTS

13	1237 FAB	PHOTOCOPYING, HIDDEN COSTS
13	1237 BAJ	COPYING METHOD, PHOTOCOPY COSTS

B. COSTS (DIRECT, INDIRECT, AND HIDDEN)

14	1237 AB	PHOTOCOPYING COSTS
7	1237 EBAD	LIBRARY PHOTOCOPYING, COSTS, ACCOUNTING
7	1237 FBAD	LIBRARY PHOTOCOPYING, COSTS, INDIRECT
3	1237 BAD	LIBRARY PHOTOCOPYING COSTS
8	1237 IFBA	PHOTOCOPYING, DIRECT AND INDIRECT COSTS
13	1237 FAB	PHOTOCOPYING, HIDDEN COSTS
13	1237 BAJ	COPYING METHOD, PHOTOCOPY COSTS

C. RALPH PHELPS

7	1237 C	PHELPS, RALPH

D. LIBRARY

7	1237 EBAD	LIBRARY PHOTOCOPYING, COSTS, ACCOUNTING
7	1237 FBAD	LIBRARY PHOTOCOPYING, COSTS, INDIRECT
7	1237 GD	LIBRARY MANAGEMENT
3	1237 BAD	LIBRARY PHOTOCOPYING COSTS

E. ACCOUNTING

7	1237 EBAD	LIBRARY PHOTOCOPYING, COSTS, ACCOUNTING

G. MANAGEMENT

7	1237 GD	LIBRARY MANAGEMENT

H. ALA COMMITTEE ON SIMPLIFIED PAYMENTS FOR PHOTOCOPYING

7	1237 H	COMMITTEE ON SIMPLIFIED PAYMENTS FOR PHOTOCOPYING, ALA RTSD

J. COPYING METHOD

13	1237 BAJ	COPYING METHOD, PHOTOCOPY COSTS

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1269

A. RANGANATHAN

6	1269 A	RANGANATHAN, S.R.
6	1269 EBA	LIBRARY SCIENCE TODAY LONDON, ASIA PUBLISHING HOUSE, 190 5 IV. VOL.1, PAPERS CONTRIBUTED ON THE 71ST BIRTHDAY OF DR. S.R. RANGANATHAN
5	1269 EBA	RANGANATHAN FESTSCHRIFT-LIBRARY SCIENCE TODAY
5	1269 A	RANGANATHAN, DR.

5	1269 FEBA	LIBRARY SCIENCE TODAY:RANGANATHAN FESTSCHRIFT-STATE OF T HE ART REVIEW
11	1269 A	RANGANATHAN, S.R.
11	1269 EBA	LIBRARY SCIENCE TODAY: RANGANATHAN FESTSCHRIFT
2	1269 A	RANGANATHAN, S.R.
13	1269 EA	RANGANATHAN, S.R., FESTSCHRIFT

B. LIBRARY SCIENCE TODAY

6	1269 EBA	LIBRARY SCIENCE TODAY LONDON, ASIA PUBLISHING HOUSE, 190 5 IV. VOL.1, PAPERS CONTRIBUTED ON THE 71ST BIRTHDAY OF DR. S.R. RANGANATHAN
6	1269 DCB	REVIEW OF LIBRARY SCIENCE TODAY, ED. BY P.N. KAULA
5	1269 EBA	RANGANATHAN FESTSCHRIFT-LIBRARY SCIENCE TODAY
5	1269 FEBA	LIBRARY SCIENCE TODAY:RANGANATHAN FESTSCHRIFT-STATE OF T HE ART REVIEW
11	1269 EBA	LIBRARY SCIENCE TODAY: RANGANATHAN FESTSCHRIFT

C. REVIEW

6	1269 DCB	REVIEW OF LIBRARY SCIENCE TODAY, ED. BY P.N. KAULA
11	1269 C	REVIEWS

D. KAULA, P.N., EDITOR

6	1269 DCB	REVIEW OF LIBRARY SCIENCE TODAY, ED. BY P.N. KAULA
5	1269 D	KAULA, P.N.
11	1269 D	P.N. KAULA
2	1269 D	KAULA, P.N. (ED.)

E. FESTSCRIFT

6	1269 EBA	LIBRARY SCIENCE TODAY LONDON, ASIA PUBLISHING HOUSE, 190 5 IV. VOL.1, PAPERS CONTRIBUTED ON THE 71ST BIRTHDAY OF DR. S.R. RANGANATHAN
5	1269 EBA	RANGANATHAN FESTSCHRIFT-LIBRARY SCIENCE TODAY
5	1269 FEBA	LIBRARY SCIENCE TODAY:RANGANATHAN FESTSCHRIFT-STATE OF T HE ART REVIEW
11	1269 EBA	LIBRARY SCIENCE TODAY: RANGANATHAN FESTSCHRIFT
11	1269 E	FESTSCHRIFTS
2	1269 E	FESTSCHRIFT
13	1269 E	FESTSCHRIFT
13	1269 EA	RANGANATHAN, S.R., FESTSCHRIFT

F. STATE OF THE ART

5 1269 FEBA LIBRARY SCIENCE TODAY:RANGANATHAN FESTSCHRIFT-STATE OF THE ART REVIEW

G. INDIAN LIBRARIANSHIP

11 1269 G INDIAN LIBRARIANSHIP

13 1269 G LIBRARIANSHIP IN INDIA

H. MYSORE

2 1269 H MYSORE

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1152

A. LIBRARY MECHANIZATION; MECHANIZATION; LIBRARY AUTOMATION; AUTOMATION

1	1152	MBA	LIBRARY MECHANIZATION-HISTORY
1	1152	OA	AUTOMATED CIRCULATION SYSTEMS
4	1152	QAMC	LIBRARY AUTOMATION, COMPUTER, BASIC INFORMATION - ADVANTAGES AND DISADVANTAGES
4	1152	RAMCB	LIBRARY AUTOMATION, COMPUTER, HISTORY AND DEVELOPMENT TO 1967
4	1152	RAMC	LIBRARY AUTOMATION, ADAPTING EXISTING SERVICES TO COMPUTERIZATION
2	1152	A	AUTOMATION
2	1152	A	MECHANIZATION
3	1152	RMA	LIBRARY MECHANIZATION, CURRENT STATUS
3	1152	RMA	LIBRARY MECHANIZATION, CURRENT DEVELOPMENTS
3	1152	NAM	TIME-SHARING IN LIBRARY AUTOMATION
3	1152	OA	AUTOMATION FOR CIRCULATION CONTROL
3	1152	AU	MACHINE SEARCHING
8	1152	MA	LIBRARY MECHANIZATION
8	1152	:ZMA	LIBRARY MECHANIZATION, KWIC AND KWOC INDEXES
8	1152	YMA	LIBRARY MECHANIZATION, BOOK CATALOGS
8	1152	OMA	LIBRARY MECHANIZATION, CIRCULATION CONTROL

B. HISTORY AND DEVELOPMENT

1	1152 MBA	LIBRARY MECHANIZATION-HISTORY
4	1152 RAMCB	LIBRARY AUTOMATION, COMPUTER, HISTORY AND DEVELOPMENT TO 1967
2	1152 B	HISTORY

C. COMPUTER

1	1152 ?ZEDC	COMPUTER GENERATED INDEXES & BIBLIOGRAPHIES
1	1152 YFC	COMPUTER GENERATED BOOK CATALOGS
1	1152 GC	FILING RULES & THE COMPUTER
1	1152 HC	COMPUTER PUBLISHING
1	1152 KC	CENTRAL & REGIONAL PROCESSING ON COMPUTERS
1	1152 MLC	REAL TIME ON COMPUTERS & ITS IMPLICATIONS FOR LIBRARY SE RVICE
1	1152 PDC	INDEXING-HUMAN & COMPUTERIZED
4	1152 QAMC	LIBRARY AUTOMATION, COMPUTER, BASIC INFORMATION - ADVANTAGES AND DISADVANTAGES
4	1152 RAMCB	LIBRARY AUTOMATION, COMPUTER, HISTORY AND DEVELOPMENT TO 1967
4	1152 RAMC	LIBRARY AUTOMATION, ADAPTING EXISTING SERVICES TO COMPUTERIZATION
4	1152 MC	COMPUTERS IN LIBRARIES, AN OVERVIEW
3	1152 ?EC	COMPUTER PRODUCED BIBLIOGRAPHIES

3	1152	YFC	COMPUTER PRODUCED BOOK CATALOGS
3	1152	GC	FILING RULES AND THE COMPUTER
3	1152	@C	COMPUTER TOOLS FOR THE LIBRARIAN

D. COMPUTER GENERATED INDEXES; MACHINE INDEXING

1	1152	?ZEDC	COMPUTER GENERATED INDEXES & BIBLIOGRAPHIES
1	1152	PDC	INDEXING-HUMAN & COMPUTERIZED
2	1152	D	MACHINE INDEXING
3	1152	D	MACHINE INDEXING
8	1152	MD	MACHINE INDEXING IN LIBRARIES

E. COMPUTER GENERATED BIBLIOGRAPHIES

1	1152	?ZEDC	COMPUTER GENERATED INDEXES & BIBLIOGRAPHIES
3	1152	?EC	COMPUTER PRODUCED BIBLIOGRAPHIES

F. COMPUTER GENERATED BOOK CATALOGS

1	1152	YFC	COMPUTER GENERATED BOOK CATALOGS
3	1152	YFC	COMPUTER PRODUCED BOOK CATALOGS

G. FILES; FILING RULES

1	1152 GC	FILING RULES & THE COMPUTER
2	1152 G	FILING RULES
3	1152 GC	FILING RULES AND THE COMPUTER
3	1152 G	FILES

H. PUBLISHING

1	1152 HC	COMPUTER PUBLISHING

I. RAMAC

1	1152 JI	RAMAC-RANDOM ACCESS
2	1152 I	RAMAC
3	1152 I	RAMAC

J. RANDOM ACCESS; DIRECT ACCESS

1	1152 JI	RAMAC-RANDOM ACCESS
2	1152 J	DIRECT ACCESS
8	1152 J	DIRECT ACCESS SYSTEMS

K. CENTRAL AND REGIONAL PROCESSING ON COMPUTERS

1	1152 KC	CENTRAL & REGIONAL PROCESSING ON COMPUTERS

L. REAL TIME; ON LINE

1	1152 MLC	REAL TIME ON COMPUTERS & ITS IMPLICATIONS FOR LIBRARY SE RVICE
1	1152 ML	ON-LINE TERMINALS & LIBRARIES
8	1152 L	ON-LINE SYSTEMS

M. LIBRARIES; LIBRARY SERVICE; LIBRARY OPERATIONS

1	1152 MBA	LIBRARY MECHANIZATION-HISTORY
1	1152 MLC	REAL TIME ON COMPUTERS & ITS IMPLICATIONS FOR LIBRARY SE RVICE
1	1152 ML	ON-LINE TERMINALS & LIBRARIES
1	1152 NM	TIME SHARING AND LIBRARIES
4	1152 QAMC	LIBRARY AUTOMATION, COMPUTER, BASIC INFORMATION - ADVANTAGES AND DISADVANTAGES
4	1152 RAMCB	LIBRARY AUTOMATION, COMPUTER, HISTORY AND DEVELOPMENT TO 1967
4	1152 RAMC	LIBRARY AUTOMATION, ADAPTING EXISTING SERVICES TO COMPUTERIZATION
4	1152 MC	COMPUTERS IN LIBRARIES, AN OVERVIEW
3	1152 RMA	LIBRARY MECHANIZATION, CURRENT STATUS
3	1152 RMA	LIBRARY MECHANIZATION, CURRENT DEVELOPMENTS
3	1152 NAM	TIME-SHARING IN LIBRARY AUTOMATION

3	1152 *M	UNIT RECORD EQUIPMENT IN LIBRARY OPERATIONS
8	1152 MA	LIBRARY MECHANIZATION
8	1152 ;ZMA	LIBRARY MECHANIZATION, KWIC AND KWOC INDEXES
8	1152 YMA	LIBRARY MECHANIZATION, BOOK CATALOGS
8	1152 OMA	LIBRARY MECHANIZATION, CIRCULATION CONTROL
8	1152 MD	MACHINE INDEXING IN LIBRARIES

N. TIME SHARING

1	1152 NM	TIME SHARING AND LIBRARIES
3	1152 NAM	TIME-SHARING IN LIBRARY AUTOMATION

O. CIRCULATION SYSTEMS; CIRCULATION CONTROL

1	1152 OA	AUTOMATED CIRCULATION SYSTEMS
2	1152 O	CIRCULATION SYSTEMS
3	1152 OA	AUTOMATION FOR CIRCULATION CONTROL
8	1152 OMA	LIBRARY MECHANIZATION, CIRCULATION CONTROL

P. HUMAN INDEXING

1	1152 PDC	INDEXING-HUMAN & COMPUTERIZED

O. ADVANTAGES AND DISADVANTAGES

4	1152 QAMC	LIBRARY AUTOMATION, COMPUTER, BASIC INFORMATION - ADVANTAGES AND DISADVANTAGES

R. CURRENT STATUS: 1967

4	1152 RAMCB	LIBRARY AUTOMATION, COMPUTER, HISTORY AND DEVELOPMENT TO 1967
4	1152 RAMC	LIBRARY AUTOMATION, ADAPTING EXISTING SERVICES TO COMPUTERIZATION
3	1152 RMA	LIBRARY MECHANIZATION, CURRENT STATUS
3	1152 RMA	LIBRARY MECHANIZATION, CURRENT DEVELOPMENTS

S. SDI

2	1152 S	SDI

T. CATALOGING

2	1152 T	CATALOGING

U. SEARCHING

2	1152 U	SEARCHING
3	1152 AU	MACHINE SEARCHING

V. HARDWARE NEEDS

2	1152 V	HARDWARE NEEDS

W. INPUT - OUTPUT DEVICES

2	1152 W	I/O DEVICES

X. COSTS

2	1152 X	COSTS

Y. BOOK CATALOGS

1	1152 YFC	COMPUTER GENERATED BOOK CATALOGS
2	1152 Y	BOOK CATALOGS
3	1152 YFC	COMPUTER PRODUCED BOOK CATALOGS
8	1152 YMA	LIBRARY MECHANIZATION, BOOK CATALOGS

Z. INDEXES

1	1152 ?ZEDC	COMPUTER GENERATED INDEXES & BIBLIOGRAPHIES
2	1152 +Z	INDEXES & ABSTRACTS
8	1152 ;ZMA	LIBRARY MECHANIZATION, KWIC AND KWOC INDEXES

+. ABSTRACTS

2	1152 +Z	INDEXES & ABSTRACTS

= PROJECT MARC

2	1152 =	PROJECT MARC

?. BIBLIOGRAPHIES

1	1152 ?ZEDC	COMPUTER GENERATED INDEXES & BIBLIOGRAPHIES
3	1152 ?EC	COMPUTER PRODUCED BIBLIOGRAPHIES

@. LIBRARIAN

3	1152 @C	COMPUTER TOOLS FOR THE LIBRARIAN

*. UNIT RECORD EQUIPMENT

3	1152 *M	UNIT RECORD EQUIPMENT IN LIBRARY OPERATIONS

; KWIC AND KWOC INDEXES

8	1152 ;ZMA	LIBRARY MECHANIZATION, KWIC AND KWOC INDEXES

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1064

A. INFORMATION SCIENCE AND TECHNOLOGY

14	1064 CBA	INFORMATION SCIENCE AND TECHNOLOGY, REVIEWS OF THE LITER ATURE
7	1064 DA	INFORMATION SCIENCE, APPLICATIONS
7	1064 NAMP	LIBRARY EDUCATION, AUTOMATION AND INFORMATION SCIENCE
7	1064 NA	INFORMATION SCIENCE EDUCATION
7	1064 AO	TECHNICAL INSTITUTES, INFORMATION SCIENCE
3	1064 RAQPX	BOOK REVIEWS, LIBRARY AND INFORMATION LITERATURE
3	1064 ARQP	LIBRARY AND INFORMATION SCIENCE LITERAWTURE
8	1064 VBUA	INFORMATION SCIENCE AND DOCUMENTATION, ANNUAL REVIEW AND STATE OF THE ART
13	1064 A	INFORMATION SCIENCE

B. ANNUAL REVIEWS; REVIEWS OF THE LITERATURE

14	1064 CBA	INFORMATION SCIENCE AND TECHNOLOGY, REVIEWS OF THE LITER ATURE
3	1064 PBTQ	ANNUAL REVIEW, LIBRARY LITERATURE

8 1064 VBUA INFORMATION SCIENCE AND DOCUMENTATION, ANNUAL REVIEW AND STATE OF THE ART

D. APPLICATIONS

7 1064 DA INFORMATION SCIENCE, APPLICATIONS

E. ROBERT TAYLOR

7 1064 E TAYLOR, ROBERT

F. AMERICAN DOCUMENTATION INSTITUTE

7 1064 F AMERICAN DOCUMENTATION INSTITUTE

13 1064 F AMERICAN DOCUMENTATION INSTITUTE

G. NATIONAL SCIENCE FOUNDATION

7 1064 G NATIONAL SCIENCE FOUNDATION

H. HERBERT MENZEL

7 1064 H MENZEL, HERBERT

I. PHYLLIS BAXENDALE

7 1064 I BAXENDALE, PHYLLIS

J. CARLOS CUADRA

7	1064 J	CUADRA, CARLOS
3	1064 J	CUADRA, CARLOS
13	1064 SWJ	CUADRA, CARLOS, ED. ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY

K. FRANCIS NEELAND

7	1064 K	NEELAND, FRANCIS

M. AUTOMATION

7	1064 NAMP	LIBRARY EDUCATION, AUTOMATION AND INFORMATION SCIENCE
7	1064 PM	LIBRARY AUTOMATION

N. EDUCATION

7	1064 NAMP	LIBRARY EDUCATION, AUTOMATION AND INFORMATION SCIENCE
7	1064 NA	INFORMATION SCIENCE EDUCATION

O. TECHNICAL INSTITUTES

7	1064 AO	TECHNICAL INSTITUTES, INFORMATION SCIENCE

P. LIBRARY

7	1064	NAMP	LIBRARY EDUCATION, AUTOMATION AND INFORMATION SCIENCE
7	1064	PM	LIBRARY AUTOMATION
3	1064	RAQPX	BOOK REVIEWS, LIBRARY AND INFORMATION LITERATURE
3	1064	PBTQ	ANNUAL REVIEW, LIBRARY LITERATURE
3	1064	ARQP	LIBRARY AND INFORMATION SCIENCE LITERAWTURE

Q. LIBRARY LITERATURE

3	1064	RAQPX	BOOK REVIEWS, LIBRARY AND INFORMATION LITERATURE
3	1064	PBTQ	ANNUAL REVIEW, LIBRARY LITERATURE
3	1064	ARQP	LIBRARY AND INFORMATION SCIENCE LITERAWTURE

R. INFORMATION SCIENCE LITERATURE

3	1064	RAQPX	BOOK REVIEWS, LIBRARY AND INFORMATION LITERATURE
3	1064	ARQP	LIBRARY AND INFORMATION SCIENCE LITERAWTURE

S. ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY

3	1064	S	ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY

8	1064 SX	ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY, BOOKREVIEW
13	1064 SWJ	CUADRA, CARLOS, ED. ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY
13	1064 S	ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY

U. DOCUMENTATION

8	1064 VBUA	INFORMATION SCIENCE AND DOCUMENTATION, ANNUAL REVIEW AND STATE OF THE ART
13	1064 U	DOCUMENTATION

V. STATE OF THE ART

8	1064 VBUA	INFORMATION SCIENCE AND DOCUMENTATION, ANNUAL REVIEW AND STATE OF THE ART

W. EDITOR

13	1064 SWJ	CUADRA, CARLOS, ED. ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY

X. BOOK REVIEW

3	1064 RAQPX	BOOK REVIEWS, LIBRARY AND INFORMATION LITERATURE

	8	1064 SX	ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY, BOOKREVIEW

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1140

A. BOOK SIZE

9	1140 BA	THICKNESS OF AVERAGE BOOK
7	1140 BA	BOOK SIZE, RESEARCH ON
7	1140 BA	BOOK SIZE, ESTIMATES OF

B. BOOKS

9	1140 BA	THICKNESS OF AVERAGE BOOK
9	1140 DCB	AUTOMATIC SHELVING OF BOOKS
9	1140 FDB	AUTOMATIC RETRIEVAL OF BOOKS
12	1140 GCB	COMPACT BOOK SHELVING
12	1140 FDCB	AUTOMATIC BOOK SHELVING & RETRIEVAL
12	1140 DCB	MECHANICAL APPLICATIONS FOR BOOK SHELVING
12	1140 GCBN	COMPACT BOOK SHELVING & STUDY SPACE
10	1140 FDB	AUTOMATIC BOOK RETRIEVAL SYSTEMS
10	1140 OCB	LIBRARY BOOK SHELVING
10	1140 DCB	AUTOMATIC BOOK SHELVING
10	1140 GQP	ADVANTAGES OF CLOSED BOOK STACKS
10	1140 PCHB	METHODS OF ARRANGING BOOKS IN STACKS
14	1140 FDCB	AUTOMATIC SHELVING AND BOOK RETRIEVAL SYSTEMS

7	114C FB	BOOK RETRIEVAL
7	114C OSCB	BOOK STORAGE, RESEARCH LIBRARIES
7	114C GCB	COMPACT BOOK STORAGE
7	114C BA	BOOK SIZE, RESEARCH ON
7	1140 BA	BOOK SIZE, ESTIMATES OF
7	114C WOCB	UNIVERSITY LIBRARIES, BOOK STORAGE

C. SHELVING OF BOOKS; BOOK STORAGE

9	114C DCB	AUTOMATIC SHELVING OF BOOKS
9	114C GFDC	IMPACT OF AUTOMATIC SHELVING & RETRIEVAL ON PERMITTING M ORE COMPACT SHELVING
9	1140 HFDC	IMPACT OF AUTOMATIC SHELVING & RETRIEVAL ON ORDERLY FLOW OF BOOK PROCESSING
9	1140 IFDC	EFFECTS OF AUTOMATIC SHELVING & RETRIEVAL ON STAFF SIZE
9	1140 JFDC	CATALOGS FOR AUTOMATIC SHELVING & RETRIEVAL SYSTEM
9	1140 FDCLO	EFFECTS OF AUTOMATIC SHELVING & RETRIEVAL SYSTEM ON LIBR ARY HOURS
9	114C MFDC	EFFECTS OF AUTOMATIC SHELVING & RETRIEVAL SYSTEM ON ARCH ITECTURAL PLANNING
12	114C GCB	COMPACT BOOK SHELVING
12	1140 FDCB	AUTOMATIC BOOK SHELVING & RETRIEVAL
12	114C DCB	MECHANICAL APPLICATIONS FOR BOOK SHELVING
12	1140 GCBN	COMPACT BOOK SHELVING & STUDY SPACE
10	1140 OCB	LIBRARY BOOK SHELVING

10	1140 DCB	AUTOMATIC BOOK SHELVING
10	1140 PCHB	METHODS OF ARRANGING BOOKS IN STACKS
14	1140 FDCB	AUTOMATIC SHELVING AND BOOK RETRIEVAL SYSTEMS
7	1140 DC	AUTOMATIC SHELVING
7	1140 OSCB	BOOK STORAGE, RESEARCH LIBRARIES
7	1140 GCB	COMPACT BOOK STORAGE
7	1140 MDC	AUTOMATIC SHELVING, CONSTRUCTION OF
7	1140 MDC	AUTOMATIC SHELVING, IMPLICATIONS FOR LIBRARY CONSTRUCTION
7	1140 VDC	AUTOMATIC SHELVING, SERVICE TO PATRONS RESULTING FROM
7	1140 JHDC	AUTOMATIC SHELVING, IMPACT ON CATALOGING
7	1140 WOCB	UNIVERSITY LIBRARIES, BOOK STORAGE

D. AUTOMATIC OR MECHANICAL BOOK SHELVING AND RETRIEVAL

9	1140 DCB	AUTOMATIC SHELVING OF BOOKS
9	1140 FDB	AUTOMATIC RETRIEVAL OF BOOKS
9	1140 GFDC	IMPACT OF AUTOMATIC SHELVING & RETRIEVAL ON PERMITTING M ORE COMPACT SHELVING
9	1140 HFDC	IMPACT OF AUTOMATIC SHELVING & RETRIEVAL ON ORDERLY FLOW OF BOOK PROCESSING
9	1140 IFDC	EFFECTS OF AUTOMATIC SHELVING & RETRIEVAL ON STAFF SIZE

9	1140 JFDC	CATALOGS FOR AUTOMATIC SHELVING & RETRIEVAL SYSTEM
9	1140 FDCLO	EFFECTS OF AUTOMATIC SHELVING & RETRIEVAL SYSTEM ON LIBR ARY HOURS
9	1140 MFDC	EFFECTS OF AUTOMATIC SHELVING & RETRIEVAL SYSTEM ON ARCH ITECTURAL PLANNING
12	1140 FDCB	AUTOMATIC BOOK SHELVING & RETRIEVAL
12	1140 DCB	MECHANICAL APPLICATIONS FOR BOOK SHELVING
10	1140 FDB	AUTOMATIC BOOK RETRIEVAL SYSTEMS
10	1140 DCB	AUTOMATIC BOOK SHELVING
14	1140 FDCB	AUTOMATIC SHELVING AND BOOK RETRIEVAL SYSTEMS
7	1140 DC	AUTOMATIC SHELVING
7	1140 MDC	AUTOMATIC SHELVING, CONSTRUCTION OF
7	1140 MDC	AUTOMATIC SHELVING, IMPLICATIONS FOR LIBRARY CONSTRUCTION
7	1140 VDC	AUTOMATIC SHELVING, SERVICE TO PATRONS RESULTING FROM
7	1140 JHDC	AUTOMATIC SHELVING, IMPACT ON CATALOGING

E. KEYED MATRIX

9	1140 E	KEYED MATRIX

F. RETRIEVAL OF BOOKS

9	1140 FDB	AUTOMATIC RETRIEVAL OF BOOKS
9	1140 GFDC	IMPACT OF AUTOMATIC SHELVING & RETRIEVAL ON PERMITTING M ORE COMPACT SHELVING
9	1140 HFDC	IMPACT OF AUTOMATIC SHELVING & RETRIEVAL ON ORDERLY FLOW OF BOOK PROCESSING
9	1140 IFDC	EFFECTS OF AUTOMATIC SHELVING & RETRIEVAL ON STAFF SIZE
9	1140 JFDC	CATALOGS FOR AUTOMATIC SHELVING & RETRIEVAL SYSTEM
9	1140 FDCLO	EFFECTS OF AUTOMATIC SHELVING & RETRIEVAL SYSTEM ON LIBR ARY HOURS
9	1140 MFDC	EFFECTS OF AUTOMATIC SHELVING & RETRIEVAL SYSTEM ON ARCH ITECTURAL PLANNING
12	1140 FDCB	AUTOMATIC BOOK SHELVING & RETRIEVAL
10	1140 FDB	AUTOMATIC BOOK RETRIEVAL SYSTEMS
14	1140 FDCB	AUTOMATIC SHELVING AND BOOK RETRIEVAL SYSTEMS
7	1140 FB	BOOK RETRIEVAL

G. COMPACT SHELVING OF BOOKS; COMPACT STORAGE OF BOOKS

9	1140 GFDC	IMPACT OF AUTOMATIC SHELVING & RETRIEVAL ON PERMITTING M ORE COMPACT SHELVING

12	1140 GCB	COMPACT BOOK SHELVING
12	1140 GCBN	COMPACT BOOK SHELVING & STUDY SPACE
7	1140 GCB	COMPACT BOOK STORAGE

H. BOOK PROCESSING

9	1140 HFDC	IMPACT OF AUTOMATIC SHELVING & RETRIEVAL ON ORDERLY FLOW OF BOOK PROCESSING
10	1140 PCHB	METHODS OF ARRANGING BOOKS IN STACKS
7	1140 JHDC	AUTOMATIC SHELVING, IMPACT ON CATALOGING

I. LIBRARY PERSONNEL: STAFF

9	1140 IFDC	EFFECTS OF AUTOMATIC SHELVING & RETRIEVAL ON STAFF SIZE

J. CATALOGS: CATALOGING

9	1140 JFDC	CATALOGS FOR AUTOMATIC SHELVING & RETRIEVAL SYSTEM
7	1140 JHDC	AUTOMATIC SHELVING, IMPACT ON CATALOGING

K. RAPID SELECTOR MACHINE

9	1140 K	RAPID SELECTOR MACHINE
12	1140 K	RAPID SELECTOR MACHINE-FANTASY

10	1140 K	RAPID SELECTOR MACHINE
7	1140 UK	RAPID SELECTOR, RALPH R. SHAW

L. LIBRARY HOURS

9	1140 FDCLO	EFFECTS OF AUTOMATIC SHELVING & RETRIEVAL SYSTEM ON LIBR ARY HOURS

M. ARCHITECTURAL PLANNING; LIBRARY CONSTRUCTION; LIBRARY BUILDINGS

9	1140 MFDC	EFFECTS OF AUTOMATIC SHELVING & RETRIEVAL SYSTEM ON ARCH ITECTURAL PLANNING
12	1140 OM	LIBRARY CONSTRUCTION .
12	1140 OM	LIBRARY BUILDING DESIGN PROPOSALS
14	1140 M	LIBRARY BUILDINGS
7	1140 MDC	AUTOMATIC SHELVING, CONSTRUCTION OF
7	1140 MDC	AUTOMATIC SHELVING, IMPLICATIONS FOR LIBRARY CONSTRUCTION
7	1140 OWSM	BUILDING PROGRAMS, UNIVERSITY AND RESEARCH LIBRARIES

N. STUDY SPACE

12	1140 GCBN	COMPACT BOOK SHELVING & STUDY SPACE

O. LIBRARY

9	1140 FDCLO	EFFECTS OF AUTOMATIC SHELVING & RETRIEVAL SYSTEM ON LIBR ARY HOURS
12	1140 OM	LIBRARY CONSTRUCTION
12	1140 OM	LIBRARY BUILDING DESIGN PROPOSALS
10	1140 OCB	LIBRARY BOOK SHELVING
14	1140 OSR	SCIENTIFIC MANAGEMENT OF RESEARCH LIBRARIES
14	1140 OST	BIBLIOGRAPHIC SERVICES IN THE RESEARCH LIBRARY
7	1140 OSCB	BOOK STORAGE, RESEARCH LIBRARIES
7	1140 WOCB	UNIVERSITY LIBRARIES, BOOK STORAGE
7	1140 OWSM	BUILDING PROGRAMS, UNIVERSITY AND RESEARCH LIBRARIES

P. CLOSED BOOK STACKS; BOOK STACKS

10	1140 BQP	ADVANTAGES OF CLOSED BOOK STACKS
10	1140 PCHB	METHODS OF ARRANGING BOOKS IN STACKS

Q. ADVANTAGES

10	1140 BQP	ADVANTAGES OF CLOSED BOOK STACKS

R. MANAGEMENT; ADMINISTRATION

14	1140	SOR	SCIENTIFIC MANAGEMENT OF RESEARCH LIBRARIES

S. RESEARCH LIBRARIES

14	1140	SOR	SCIENTIFIC MANAGEMENT OF RESEARCH LIBRARIES
14	1140	OST	BIBLIOGRAPHIC SERVICES IN THE RESEARCH LIBRARY
7	1140	OSCB	BOOK STORAGE, RESEARCH LIBRARIES
7	1140	OWSM	BUILDING PROGRAMS, UNIVERSITY AND RESEARCH LIBRARIES

T. BIBLIOGRAPHIC SERVICES

14	1140	OST	BIBLIOGRAPHIC SERVICES IN THE RESEARCH LIBRARY

U. RALPH R. SHAW

7	1140	UK	RAPID SELECTOR, RALPH R. SHAW

V. SERVICES TO PATRONS

7	1140	VDC	AUTOMATIC SHELVING, SERVICE TO PATRONS RESULTING FROM

W. UNIVERSITY LIBRARIES

7	1140	WUCB	UNIVERSITY LIBRARIES, BOOK STORAGE

7	1140 OWSM	BUILDING PROGRAMS, UNIVERSITY AND RESEARCH LIBRARIES

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1143

A. LIBRARY OF CONGRESS

9	1143 BA	LIBRARY OF CONGRESS, AUTOMATION
9	1143 DCA	LIBRARY OF CONGRESS, COMPUTER & ACQUISITIONS
12	1143 RBA	LIBRARY OF CONGRESS AUTOMATION-BIBLIOGRAPHY
10	1143 TURNBA	BIBLIOGRAPHY OF ARTICLES DEALING WITH LIBRARY OF CONGRES S AUTOMATION PROJECTS, TO 1967

B. AUTOMATION AND MECHNAIZATION

9	1143 BA	LIBRARY OF CONGRESS, AUTOMATION
9	1143 ICB	COMPUTER & AUTOMATION OF SERIALS RECORD
9	1143 MB	AUTOMATION-STATE OF THE ART
9	1143 NB	AUTOMATED OPERATIONS
9	1143 PKB	FUTURE OF AUTOMATION IN LIBRARIES
12	1143 REB	CATALOGING & AUTOMATION-BIBLIOGRAPHY
12	1143 RBA	LIBRARY OF CONGRESS AUTOMATION-BIBLIOGRAPHY
12	1143 NRKB	MECHANIZATION OF LIBRARY FUNCTIONS-BIBLIOGRAPHY
12	1143 SRKB	LIBRARY AUTOMATION-BIBLIOGRAPHY-1960

12	1143	RDB	ACQUISITIONS & AUTOMATION-BIBLIOGRAPHY
10	1143	UTRKB	GENERAL AND MISCELLANEOUS BIBLIOGRAPHY OF ARTICLES DEALI NG WITH LIBRARY AUTOMATION, TO 1967
10	1143	TURKDB	BIBLIOGRAPHY OF ARTICLES DEALING WITH ACQUISITIONS ASPEC TS OF LIBRARY AUTOMATION, TO 1967
10	1143	TURNBA	BIBLIOGRAPHY OF ARTICLES DEALING WITH LIBRARY OF CONGRES S AUTOMATION PROJECTS, TO 1967
10	1143	TURKEB	BIBLIOGRAPHY OF ARTICLES DEALING WITH CATALOGING ASPECTS OF LIBRARY AUTOMATION TO 1967
10	1143	TURKIB	BIBLIOGRAPHY OF ARTICLES DEALING WITH SERIALS ASPECTS OF LIBRARY AUTOMATION, TO 1967
14	1143	RKB	LIBRARY AUTOMATION, BIBLIOGRAPHY
7	1143	RKB	LIBRARY AUTOMATION, BIBLIOGRAPHIES

C. COMPUTERS

9	1143	DCA	LIBRARY OF CONGRESS, COMPUTER & ACQUISITIONS
9	1143	NFEC	COMPUTER & CATALOG CARD PRODUCTION
9	1143	NGEC	COMPUTER & BOOK CATALOG PRODUCTION
9	1143	HC	COMPUTER CIRCULATION SYSTEMS
9	1143	ICB	COMPUTER & AUTOMATION OF SERIALS RECORD

	9	1143 KC	COMPUTERS IN THE LIBRARY-GENERAL INFORMATION
	9	1143 QC	INFORMATION NETWORKS & THE COMPUTER

D. ACQUISITIONS

	9	1143 DCA	LIBRARY OF CONGRESS, COMPUTER & ACQUISITIONS
	12	1143 RDB	ACQUISITIONS & AUTOMATION-BIBLIOGRAPHY
	10	1143 TURKDB	BIBLIOGRAPHY OF ARTICLES DEALING WITH ACQUISITIONS ASPEC TS OF LIBRARY AUTOMATION, TO 1967

E. CATALOGS AND CATALOGING

	9	1143 NFEC	COMPUTER & CATALOG CARD PRODUCTION
	9	1143 NGEC	COMPUTER & BOOK CATALOG PRODUCTION
	12	1143 RNGE	BOOK CATALOG PRODUCTION-BIBLIOGRAPHY
	12	1143 REB	CATALOGING & AUTOMATION-BIBLIOGRAPHY
	10	1143 TURKEB	BIBLIOGRAPHY OF ARTICLES DEALING WITH CATALOGING ASPECTS OF LIBRARY AUTOMATION TO 1967
	10	1143 TURGE	BIBLIOGRAPHY OF ARTICLES DEALING WITH BOOK CATALOGS, TO 1967

F. CATALOG CARDS

9	1143 NFEC	COMPUTER & CATALOG CARD PRODUCTION

G. BOOK CATALOGS

9	1143 NGEC	COMPUTER & BOOK CATALOG PRODUCTION
12	1143 RNGE	BOOK CATALOG PRODUCTION-BIBLIOGRAPHY
10	1143 TURGE	BIBLIOGRAPHY OF ARTICLES DEALING WITH BOOK CATALOGS, TO 1967

H. CIRCULATION SYSTEMS

9	1143 HC	COMPUTER CIRCULATION SYSTEMS

I. SERIALS

9	1143 ICB	COMPUTER & AUTOMATION OF SERIALS RECORD
12	1143 RI	SERIALS' AUTOMATION-BIBLIOGRAPHY
10	1143 TURKIB	BIBLIOGRAPHY OF ARTICLES DEALING WITH SERIALS ASPECTS OF LIBRARY AUTOMATION, TO 1967

J. SYSTEMS ANALYSIS

9	1143 J	SYSTEMS ANALYSIS
12	1143 RKJ	SYSTEMS ANALYSIS IN LIBRARIES-BIBLIOGRAPHY

10	1143	TURJ	BIBLIOGRAPHY OF ARTICLES DEALING WITH SYSTEMS ANALYSIS, TO 1967

K. LIBRARY; LIBRARIES

9	1143	KC	COMPUTERS IN THE LIBRARY-GENERAL INFORMATION
9	1143	NLK	DATA PROCESSING IN LIBRARIES
9	1143	PKB	FUTURE OF AUTOMATION IN LIBRARIES
12	1143	NRKB	MECHANIZATION OF LIBRARY FUNCTIONS-BIBLIOGRAPHY
12	1143	SRKB	LIBRARY AUTOMATION-BIBLIOGRAPHY-1960
12	1143	RKJ	SYSTEMS ANALYSIS IN LIBRARIES-BIBLIOGRAPHY
10	1143	UTRKB	GENERAL AND MISCELLANEOUS BIBLIOGRAPHY OF ARTICLES DEALI NG WITH LIBRARY AUTOMATION, TO 1967
10	1143	TURKDB	BIBLIOGRAPHY OF ARTICLES DEALING WITH ACQUISITIONS ASPEC TS OF LIBRARY AUTOMATION, TO 1967
10	1143	TURKEB	BIBLIOGRAPHY OF ARTICLES DEALING WITH CATALOGING ASPECTS OF LIBRARY AUTOMATION TO 1967
10	1143	TURKIB	BIBLIOGRAPHY OF ARTICLES DEALING WITH SERIALS ASPECTS OF LIBRARY AUTOMATION, TO 1967
14	1143	RKB	LIBRARY AUTOMATION, BIBLIOGRAPHY
7	1143	RKB	LIBRARY AUTOMATION, BIBLIOGRAPHIES

L. DATA PROCESSING

9	1143	NLK	DATA PROCESSING IN LIBRARIES

M. STATE OF THE ART

9	1143	MB	AUTOMATION-STATE OF THE ART

N. OPERATIONS; PROCEDURES; PRODUCTION; PROJECTS; FUNCTIONS

9	1143	NFEC	COMPUTER & CATALOG CARD PRODUCTION
9	1143	NGEC	COMPUTER & BOOK CATALOG PRODUCTION
9	1143	NLK	DATA PROCESSING IN LIBRARIES
9	1143	NB	AUTOMATED OPERATIONS
12	1143	RNGE	BOOK CATALOG PRODUCTION-BIBLIOGRAPHY
12	1143	NRKB	MECHANIZATION OF LIBRARY FUNCTIONS-BIBLIOGRAPHY
10	1143	TURNBA	BIBLIOGRAPHY OF ARTICLES DEALING WITH LIBRARY OF CONGRES S AUTOMATION PROJECTS, TO 1967

O. INTREX

9	1143	O	INTREX

P. FUTURE TRENDS

9	1143	PKB	FUTURE OF AUTOMATION IN LIBRARIES

Q. INFORMATION NETWORKS

	9	1143 QC	INFORMATION NETWORKS & THE COMPUTER

R. BIBLIOGRAPHY

12	1143 RI	SERIALS' AUTOMATION-BIBLIOGRAPHY
12	1143 RNGE	BOOK CATALOG PRODUCTION-BIBLIOGRAPHY
12	1143 REB	CATALOGING & AUTOMATION-BIBLIOGRAPHY
12	1143 RBA	LIBRARY OF CONGRESS AUTOMATION-BIBLIOGRAPHY
12	1143 NRKB	MECHANIZATION OF LIBRARY FUNCTIONS-BIBLIOGRAPHY
12	1143 SRKB	LIBRARY AUTOMATION-BIBLIOGRAPHY-1960
12	1143 RDB	ACQUISITIONS & AUTOMATION-BIBLIOGRAPHY
12	1143 RKJ	SYSTEMS ANALYSIS IN LIBRARIES-BIBLIOGRAPHY
10	1143 UTRKB	GENERAL AND MISCELLANEOUS BIBLIOGRAPHY OF ARTICLES DEALI NG WITH LIBRARY AUTOMATION, TO 1967
10	1143 TURKDB	BIBLIOGRAPHY OF ARTICLES DEALING WITH ACQUISITIONS ASPEC TS OF LIBRARY AUTOMATION, TO 1967
10	1143 TURNBA	BIBLIOGRAPHY OF ARTICLES DEALING WITH LIBRARY OF CONGRES S AUTOMATION PROJECTS, TO 1967
10	1143 TURKEB	BIBLIOGRAPHY OF ARTICLES DEALING WITH CATALOGING ASPECTS OF LIBRARY AUTOMATION TO 1967

10	1143	TURGE	BIBLIOGRAPHY OF ARTICLES DEALING WITH BOOK CATALOGS, TO 1967
10	1143	TURKIB	BIBLIOGRAPHY OF ARTICLES DEALING WITH SERIALS ASPECTS OF LIBRARY AUTOMATION, TO 1967
10	1143	TURJ	BIBLIOGRAPHY OF ARTICLES DEALING WITH SYSTEMS ANALYSIS, TO 1967
14	1143	RKB	LIBRARY AUTOMATION, BIBLIOGRAPHY
7	1143	RKB	LIBRARY AUTOMATION, BIBLIOGRAPHIES

S. 1960

12	1143	SRKB	LIBRARY AUTOMATION-BIBLIOGRAPHY-1960

T. BIBLIOGRAPHY OF ARTICLES

10	1143	UTRKB	GENERAL AND MISCELLANEOUS BIBLIOGRAPHY OF ARTICLES DEALI NG WITH LIBRARY AUTOMATION, TO 1967
10	1143	TURKDB	BIBLIOGRAPHY OF ARTICLES DEALING WITH ACQUISITIONS ASPEC TS OF LIBRARY AUTOMATION, TO 1967
10	1143	TURNBA	BIBLIOGRAPHY OF ARTICLES DEALING WITH LIBRARY OF CONGRES S AUTOMATION PROJECTS, TO 1967
10	1143	TURKEB	BIBLIOGRAPHY OF ARTICLES DEALING WITH CATALOGING ASPECTS OF LIBRARY AUTOMATION TO 1967

	10	1143 TURGE	BIBLIOGRAPHY OF ARTICLES DEALING WITH BOOK CATALOGS, TO 1967
	10	1143 TURKIB	BIBLIOGRAPHY OF ARTICLES DEALING WITH SERIALS ASPECTS OF LIBRARY AUTOMATION, TO 1967
	10	1143 TURJ	BIBLIOGRAPHY OF ARTICLES DEALING WITH SYSTEMS ANALYSIS, TO 1967
U.	UP TO 1967		
	10	1143 UTRKB	GENERAL AND MISCELLANEOUS BIBLIOGRAPHY OF ARTICLES DEALI NG WITH LIBRARY AUTOMATION, TO 1967
	10	1143 TURKDB	BIBLIOGRAPHY OF ARTICLES DEALING WITH ACQUISITIONS ASPEC TS OF LIBRARY AUTOMATION, TO 1967
	10	1143 TURNBA	BIBLIOGRAPHY OF ARTICLES DEALING WITH LIBRARY OF CONGRES S AUTOMATION PROJECTS, TO 1967
	10	1143 TURKEB	BIBLIOGRAPHY OF ARTICLES DEALING WITH CATALOGING ASPECTS OF LIBRARY AUTOMATION TO 1967
	10	1143 TURGE	BIBLIOGRAPHY OF ARTICLES DEALING WITH BOOK CATALOGS, TO 1967
	10	1143 TURKIB	BIBLIOGRAPHY OF ARTICLES DEALING WITH SERIALS ASPECTS OF LIBRARY AUTOMATION, TO 1967
	10	1143 TURJ	BIBLIOGRAPHY OF ARTICLES DEALING WITH SYSTEMS ANALYSIS, TO 1967

APPENDIX G

STATISTICAL TABLES OF FINDINGS FOR PACKETS VIII, IX, AND X

TABLE V - 1
PACKET VIII
PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0068	AB and KB	40.0%	0.0%		
	AB and KC	42.9%	0.0%		
	AB and HK	9.1%	0.0%		
	AB and BM	62.5%	0.0%		
	KB and KC	33.3%	0.0%		
	KB and HK	40.0%	0.0%		
	KB and BM	36.4%	0.0%		
	KC and HK	25.0%	0.0%		
	KC and BM	37.5%	0.0%		
	HK and BM	18.2%	16.7%		
				34.5%	1.7%
0091	AB and KB	42.9%	0.0%		
	AB and KC	33.3%	0.0%		
	AB and HK	42.9%	0.0%		
	AB and BM	28.6%	0.0%		
	KB and KC	42.9%	0.0%		
	KB and HK	60.0%	0.0%		
	KB and BM	23.1%	0.0%		
	KC and HK	25.0%	12.5%		
	KC and BM	20.0%	7.1%		
	HK and BM	23.1%	0.0%		
				34.2%	2.0%
0123	AB and KB	40.0%	0.0%		
	AB and KC	23.1%	0.0%		
	AB and HK	8.3%	0.0%		
	AB and BM	20.0%	0.0%		
	KB and KC	9.1%	0.0%		
	KB and HK	12.5%	0.0%		
	KB and BM	40.0%	0.0%		
	KC and HK	10.0%	0.0%		
	KC and BM	6.7%	0.0%		
	HK and BM	8.3%	0.0%		
				17.8%	0.0%
0207	AB and KB	33.3%	0.0%		
	AB and KC	30.0%	0.0%		
	AB and HK	50.0%	0.0%		
	AB and BM	40.0%	0.0%		
	KB and KC	37.5%	16.7%		
	KB and HK	42.9%	25.0%		
	KB and BM	33.3%	0.0%		
	KC and HK	57.1%	20.0%		
	KC and BM	30.0%	0.0%		
	HK and BM	50.0%	0.0%		
				40.4%	6.2%

TABLE V - 1
PACKET VIII
PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0302	AB and KB	33.3%	0.0%		
	AB and KC	11.8%	0.0%		
	AB and HK	11.1%	0.0%		
	AB and BM	31.6%	0.0%		
	KB and KC	18.2%	0.0%		
	KB and HK	27.3%	0.0%		
	KB and BM	35.7%	0.0%		
	KC and HK	18.2%	0.0%		
	KC and BM	28.6%	0.0%		
	HK and BM	26.7%	20.0%		
				24.3%	2.0%
0316	AB and KB	43.8%	0.0%		
	AB and KC	20.0%	0.0%		
	AB and HK	31.3%	0.0%		
	AB and BM	33.3%	0.0%		
	KB and KC	30.0%	0.0%		
	KB and HK	45.5%	16.7%		
	KB and BM	18.8%	0.0%		
	KC and HK	10.0%	0.0%		
	KC and BM	16.7%	0.0%		
	HK and BM	0.0%	0.0%		
				24.9%	1.7%
0382	AB and KB	33.3%	0.0%		
	AB and KC	71.4%	0.0%		
	AB and HK	45.5%	0.0%		
	AB and BM	33.3%	0.0%		
	KB and KC	42.9%	0.0%		
	KB and HK	55.6%	0.0%		
	KB and BM	25.0%	0.0%		
	KC and HK	55.6%	0.0%		
	KC and BM	42.9%	20.0%		
	HK and BM	55.6%	20.0%		
				46.1%	4.0%
0414	AB and KB	11.1%	0.0%		
	AB and KC	12.1%	0.0%		
	AB and HK	24.1%	0.0%		
	AB and BM	24.1%	0.0%		
	KB and KC	0.0%	0.0%		
	KB and HK	9.1%	0.0%		
	KB and BM	9.1%	0.0%		
	KC and HK	64.0%	21.2%		
	KC and BM	46.4%	31.8%		
	HK and BM	73.9%	29.5%		
				27.4%	8.2%

TABLE V - 1
PACKET VIII
PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0433	AB and KB	25.0%	0.0%		
	AB and KC	37.5%	0.0%		
	AB and HK	42.9%	0.0%		
	AB and BM	50.0%	0.0%		
	KB and KC	10.0%	0.0%		
	KB and HK	11.1%	0.0%		
	KB and BM	12.5%	0.0%		
	KC and HK	83.3%	33.3%		
	KC and BM	42.9%	0.0%		
	HK and BM	50.0%	0.0%		
				36.5%	3.3%
0504	AB and KB	80.0%	0.0%		
	AB and KC	33.3%	0.0%		
	AB and HK	37.5%	0.0%		
	AB and BM	83.3%	0.0%		
	KB and KC	37.5%	20.0%		
	KB and HK	42.9%	25.0%		
	KB and BM	66.7%	0.0%		
	KC and HK	62.5%	40.0%		
	KC and BM	30.0%	0.0%		
	HK and BM	33.3%	0.0%		
				50.7%	8.5%
0526	AB and KB	50.0%	0.0%		
	AB and KC	27.3%	0.0%		
	AB and BM	30.8%	0.0%		
	AB and HK	18.2%	0.0%		
	KB and KC	10.0%	0.0%		
	KB and BM	55.6%	14.3%		
	KB and HK	42.9%	0.0%		
	KC and BM	8.3%	0.0%		
	KC and HK	12.5%	20.0%		
	BM and HK	33.3%	0.0%		
				28.6%	3.4%
0551	AB and KB	57.1%	0.0%		
	AB and KC	28.6%	0.0%		
	AB and HK	42.9%	0.0%		
	AB and BM	18.2%	0.0%		
	KB and KC	33.3%	0.0%		
	KB and HK	62.5%	20.0%		
	KB and BM	45.5%	0.0%		
	KC and HK	37.5%	0.0%		
	KC and BM	40.0%	0.0%		
	HK and BM	36.4%	0.0%		
				40.2%	2.0%

PACKET VIII

PERCENTAGE OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0593	AB and KB	22.2%	0.0%		
	AB and KC	27.3%	0.0%		
	AB and HK	50.0%	0.0%		
	AB and BM	30.8%	0.0%		
	KB and KC	37.5%	0.0%		
	KB and HK	28.6%	14.3%		
	KB and BM	16.7%	0.0%		
	KC and HK	33.3%	0.0%		
	KC and BM	30.8%	0.0%		
	HK and BM	25.0%	0.0%		
				30.2%	1.4%
0662	AB and KB	50.0%	0.0%		
	AB and KC	28.6%	0.0%		
	AB and HK	60.0%	0.0%		
	AB and BM	80.0%	0.0%		
	KB and KC	42.9%	0.0%		
	KB and HK	50.0%	14.3%		
	KB and BM	42.9%	0.0%		
	KC and HK	28.6%	0.0%		
	KC and BM	25.0%	0.0%		
	HK and BM	80.0%	16.7%		
				48.8%	3.1%
0681	AB and KB	33.3%	0.0%		
	AB and KC	28.6%	0.0%		
	AB and HK	37.5%	0.0%		
	AB and BM	30.0%	0.0%		
	KB and KC	23.1%	0.0%		
	KB and HK	50.0%	0.0%		
	KB and BM	22.2%	0.0%		
	KC and HK	25.0%	0.0%		
	KC and BM	13.3%	11.1%		
	HK and BM	25.0%	0.0%		
				28.8%	1.1%
0728	AB and KB	50.0%	0.0%		
	AB and KC	12.5%	0.0%		
	AB and HK	20.0%	0.0%		
	AB and BM	42.9%	0.0%		
	KB and KC	25.0%	0.0%		
	KB and HK	40.0%	0.0%		
	KB and BM	22.2%	0.0%		
	KC and HK	40.0%	0.0%		
	KC and BM	10.0%	14.3%		
	HK and BM	14.3%	0.0%		
				27.7%	1.4%

TABLE V - 1
PACKET VIII
PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0769	AB and KB	66.7%	0.0%		
	AB and KC	50.0%	0.0%		
	AB and HK	30.0%	0.0%		
	AB and BM	25.0%	0.0%		
	KB and KC	25.0%	0.0%		
	KB and HK	10.0%	0.0%		
	KB and BM	14.3%	0.0%		
	KC and HK	30.0%	9.1%		
	KC and BM	42.9%	37.5%		
	HK and BM	10.0%	12.5%		
				30.4%	5.9%
0789	AB and KB	20.0%	0.0%		
	AB and KC	9.1%	0.0%		
	AB and HK	5.0%	0.0%		
	AB and BM	14.3%	0.0%		
	KB and KC	29.4%	0.0%		
	KB and HK	18.8%	0.0%		
	KB and BM	16.7%	0.0%		
	KC and HK	38.9%	9.1%		
	KC and BM	5.3%	0.0%		
	HK and BM	13.3%	0.0%		
				17.1%	0.9%
0847	AB and KB	40.0%	0.0%		
	AB and KC	22.2%	0.0%		
	AB and HK	18.8%	0.0%		
	AB and BM	4.5%	0.0%		
	KB and KC	8.3%	0.0%		
	KB and HK	25.0%	0.0%		
	KB and BM	0.0%	0.0%		
	KC and HK	22.2%	0.0%		
	KC and BM	15.4%	16.7%		
	HK and BM	20.0%	0.0%		
				17.6%	1.7%
0872	AB and KB	20.0%	0.0%		
	AB and KC	20.0%	0.0%		
	AB and HK	21.4%	0.0%		
	AB and BM	20.0%	0.0%		
	KB and KC	20.0%	14.3%		
	KB and HK	22.2%	16.7%		
	KB and BM	20.0%	14.3%		
	KC and HK	57.1%	40.0%		
	KC and BM	20.0%	14.3%		
	HK and BM	37.5%	16.7%		
				25.8%	11.6%

PACKET VIII

PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0960	AB and KB	25.0%	0.0%		
	AB and KC	25.0%	0.0%		
	AB and HK	25.0%	0.0%		
	AB and BM	13.3%	0.0%		
	KB and KC	0.0%	0.0%		
	KB and HK	25.0%	0.0%		
	KB and BM	7.4%	0.0%		
	KC and HK	15.4%	0.0%		
	KC and BM	0.0%	0.0%		
	HK and BM	13.3%	0.0%		
				14.9%	0.0%
0993	AB and KB	16.7%	0.0%		
	AB and KC	40.0%	0.0%		
	AB and HK	25.0%	0.0%		
	AB and BM	33.3%	0.0%		
	KB and KC	14.3%	0.0%		
	KB and HK	50.0%	0.0%		
	KB and BM	28.6%	14.3%		
	KC and HK	20.0%	0.0%		
	KC and BM	50.0%	12.5%		
	HK and BM	40.0%	0.0%		
				31.8%	2.7%
1014	AB and KB	38.5%	0.0%		
	AB and KC	14.3%	0.0%		
	AB and HK	61.5%	0.0%		
	AB and BM	46.2%	0.0%		
	KB and KC	11.1%	0.0%		
	KB and HK	50.0%	11.1%		
	KB and BM	44.4%	0.0%		
	KC and HK	30.0%	11.1%		
	KC and BM	37.5%	14.3%		
	HK and BM	60.0%	25.0%		
				39.4%	6.1%
1039	AB and KB	71.4%	0.0%		
	AB and KC	57.1%	0.0%		
	AB and HK	85.7%	0.0%		
	AB and BM	85.7%	0.0%		
	KB and KC	80.0%	0.0%		
	KB and HK	83.3%	0.0%		
	KB and BM	83.3%	0.0%		
	KC and HK	66.7%	0.0%		
	KC and BM	66.7%	0.0%		
	HK and BM	100.0%	0.0%		
				78.0%	0.0%

PACKET VIII

PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
1042	AB and KB	40.0%	0.0%		
	AB and KC	57.1%	0.0%		
	AB and HK	42.9%	0.0%		
	AB and BM	50.0%	0.0%		
	KB and KC	44.4%	0.0%		
	KB and HK	33.3%	0.0%		
	KB and BM	37.5%	0.0%		
	KC and HK	50.0%	40.0%		
	KC and BM	33.3%	40.0%		
	HK and BM	40.0%	50.0%		
				42.9%	13.0%

PACKET XI
PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0054	SB and GH	46.7%	0.0%		
	SB and EL	15.4%	0.0%		
	SB and MS	16.7%	0.0%		
	SB and KW	25.0%	0.0%		
	GH and EL	21.4%	0.0%		
	GH and MS	33.3%	0.0%		
	GH and KW	30.8%	0.0%		
	EL and MS	28.6%	0.0%		
	EL and KW	66.7%	0.0%		
	MS and KW	50.0%	0.0%		
				33.5%	0.0%
0081	SB and GH	26.7%	0.0%		
	SB and EL	40.0%	0.0%		
	SB and MS	12.5%	0.0%		
	SB and KW	44.4%	0.0%		
	GH and EL	35.7%	0.0%		
	GH and MS	7.7%	0.0%		
	GH and KW	28.6%	0.0%		
	EL and MS	12.5%	0.0%		
	EL and KW	30.0%	0.0%		
	MS and KW	14.3%	0.0%		
				25.2%	0.0%
0096	SB and GH	42.1%	5.5%		
	SB and EL	27.8%	0.0%		
	SB and MS	13.3%	0.0%		
	SB and KW	17.6%	0.0%		
	GH and EL	40.0%	0.0%		
	GH and MS	22.2%	15.4%		
	GH and KW	31.6%	0.0%		
	EL and MS	28.6%	0.0%		
	EL and KW	61.5%	0.0%		
	MS and KW	25.0%	10.0%		
				31.0%	3.1%
0099	SB and GH	27.3%	18.2%		
	SB and EL	44.4%	11.1%		
	SB and MS	11.1%	12.5%		
	SB and KW	37.5%	0.0%		
	GH and EL	57.1%	12.5%		
	GH and MS	14.3%	14.3%		
	GH and KW	50.0%	0.0%		
	EL and MS	16.7%	0.0%		
	EL and KW	60.0%	0.0%		
	MS and KW	25.0%	0.0%		
				34.3%	6.9%

PACKET IX

PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0217	SB and GH	33.3%	0.0%		
	SB and EL	5.6%	0.0%		
	SB and MS	30.0%	0.0%		
	SB and KW	54.5%	9.1%		
	GH and EL	11.8%	0.0%		
	GH and MS	44.4%	12.5%		
	GH and KW	30.8%	0.0%		
	EL and MS	14.3%	0.0%		
	EL and KW	11.1%	0.0%		
	MS and KW	55.6%	0.0%		
				29.1%	2.2%
0261	SB and GH	30.0%	0.0%		
	SB and EL	27.3%	0.0%		
	SB and MS	42.9%	0.0%		
	SB and KW	20.0%	0.0%		
	GH and EL	15.4%	0.0%		
	GH and MS	22.2%	0.0%		
	GH and KW	20.0%	0.0%		
	EL and MS	33.3%	0.0%		
	EL and KW	16.7%	0.0%		
	MS and KW	25.0%	0.0%		
				26.3%	0.0%
0299	SB and GH	12.5%	0.0%		
	SB and EL	18.8%	0.0%		
	SB and MS	12.5%	0.0%		
	SB and KW	15.8%	0.0%		
	GH and EL	10.0%	0.0%		
	GH and MS	23.5%	7.1%		
	GH and KW	19.0%	0.0%		
	EL and MS	18.2%	0.0%		
	EL and KW	21.4%	0.0%		
	MS and KW	14.3%	0.0%		
				16.6%	0.7%
0309	SB and GH	25.0%	0.0%		
	SB and EL	14.3%	0.0%		
	SB and MS	22.2%	0.0%		
	SB and KW	37.5%	0.0%		
	GH and EL	35.3%	0.0%		
	GH and MS	63.6%	55.5%		
	GH and KW	50.0%	9.1%		
	EL and MS	35.7%	0.0%		
	EL and KW	18.8%	0.0%		
	MS and KW	27.3%	11.1%		
				33.0%	7.6%

PACKET IX

PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0400	SB and GH	66.7%	4.8%		
	SB and EL	60.0%	0.0%		
	SB and MS	50.0%	7.7%		
	SB and KW	45.5%	0.0%		
	GH and EL	63.6%	0.0%		
	GH and MS	54.5%	6.7%		
	GH and KW	50.0%	0.0%		
	EL and MS	44.4%	0.0%		
	EL and KW	40.0%	0.0%		
	MS and KW	62.5%	0.0%		
				53.7%	1.9%
0420	SB and GH	40.0%	0.0%		
	SB and EL	18.8%	0.0%		
	SB and MS	26.7%	0.0%		
	SB and KW	28.6%	0.0%		
	GH and EL	50.0%	0.0%		
	GH and MS	38.5%	0.0%		
	GH and KW	30.8%	0.0%		
	EL and MS	60.0%	0.0%		
	EL and KW	66.7%	0.0%		
	MS and KW	66.7%	0.0%		
				42.7%	0.0%
0493	SB and GH	50.0%	0.0%		
	SB and EL	30.0%	0.0%		
	SB and MS	27.3%	0.0%		
	SB and KW	21.4%	0.0%		
	GH and EL	30.8%	0.0%		
	GH and MS	20.0%	0.0%		
	GH and KW	40.0%	0.0%		
	EL and MS	30.0%	0.0%		
	EL and KW	23.1%	0.0%		
	MS and KW	13.3%	0.0%		
				28.6%	0.0%
0515	SB and GH	15.8%	0.0%		
	SB and EL	5.9%	0.0%		
	SB and MS	6.3%	0.0%		
	SB and KW	10.5%	0.0%		
	GH and EL	37.5%	0.0%		
	GH and MS	40.0%	18.2%		
	GH and KW	47.1%	7.7%		
	EL and MS	41.7%	0.0%		
	EL and KW	40.0%	0.0%		
	MS and KW	25.0%	8.3%		
				27.0%	3.4%

PACKET IX
PERCENTAGE OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0522	SB and GH	28.6%	0.0%		
	SB and EL	14.3%	0.0%		
	SB and MS	16.7%	0.0%		
	SB and KW	35.3%	0.0%		
	GH and EL	23.5%	0.0%		
	GH and MS	18.8%	11.1%		
	GH and KW	21.7%	8.3%		
	EL and MS	33.3%	0.0%		
	EL and KW	13.3%	0.0%		
	MS and KW	15.4%	16.7%		
				22.1%	3.6%
0549	SB and GH	11.1%	0.0%		
	SB and EL	37.5%	0.0%		
	SB and MS	33.3%	0.0%		
	SB and KW	14.3%	0.0%		
	GH and EL	31.3%	6.7%		
	GH and MS	37.5%	18.6%		
	GH and KW	18.2%	0.0%		
	EL and MS	85.7%	12.5%		
	EL and KW	30.8%	0.0%		
	MS and KW	28.6%	0.0%		
				32.8%	3.8%
0596	SB and GH	50.0%	0.0%		
	SB and EL	33.3%	0.0%		
	SB and MS	33.3%	0.0%		
	SB and KW	14.3%	0.0%		
	GH and EL	50.0%	50.0%		
	GH and MS	50.0%	50.0%		
	GH and KW	11.1%	14.3%		
	EL and MS	33.3%	33.3%		
	EL and KW	14.3%	0.0%		
	MS and KW	14.3%	0.0%		
				30.4%	14.8%
0603	SB and GH	15.8%	0.0%		
	SB and EL	18.8%	0.0%		
	SB and MS	23.1%	0.0%		
	SB and KW	27.3%	0.0%		
	GH and EL	52.6%	5.3%		
	GH and MS	36.8%	12.4%		
	GH and KW	50.0%	0.0%		
	EL and MS	27.8%	6.7%		
	EL and KW	40.0%	0.0%		
	MS and KW	63.6%	0.0%		
				35.6%	2.4%

PACKET IX

PERCENTAGE OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0613	SB and GH	35.7%	0.0%		
	SB and EL	15.4%	0.0%		
	SB and MS	22.2%	0.0%		
	SB and KW	26.7%	0.0%		
	GH and EL	20.0%	0.0%		
	GH and MS	16.7%	0.0%		
	GH and KW	29.4%	0.0%		
	EL and MS	25.0%	0.0%		
	EL and KW	20.0%	0.0%		
	MS and KW	16.7%	0.0%		
				22.8%	0.0%
0621	SB and GH	41.7%	0.0%		
	SB and EL	18.2%	0.0%		
	SB and MS	30.0%	0.0%		
	SB and KW	30.8%	0.0%		
	GH and EL	14.3%	0.0%		
	GH and MS	23.1%	9.1%		
	GH and KW	33.3%	7.1%		
	EL and MS	50.0%	0.0%		
	EL and KW	23.1%	0.0%		
	MS and KW	23.1%	10.0%		
				28.8%	2.6%
0723	SB and GH	75.0%	8.3%		
	SB and EL	44.4%	0.0%		
	SB and MS	12.5%	0.0%		
	SB and KW	62.5%	0.0%		
	GH and EL	57.1%	0.0%		
	GH and MS	16.7%	0.0%		
	GH and KW	57.1%	0.0%		
	EL and MS	20.0%	0.0%		
	EL and KW	66.7%	0.0%		
	MS and KW	20.0%	0.0%		
				43.2%	0.8%
0750	SB and GH	44.4%	0.0%		
	SB and EL	11.1%	0.0%		
	SB and MS	42.9%	0.0%		
	SB and KW	22.2%	0.0%		
	GH and EL	10.0%	0.0%		
	GH and MS	37.5%	0.0%		
	GH and KW	33.3%	0.0%		
	EL and MS	33.3%	0.0%		
	EL and KW	12.5%	0.0%		
	MS and KW	28.6%	0.0%		
				27.6%	0.0%

PACKET IX

PERCENTAGE OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0776	SB and GH	66.7%	0.0%		
	SB and EL	50.0%	0.0%		
	SB and MS	33.3%	0.0%		
	SB and KW	80.0%	0.0%		
	GH and EL	50.0%	0.0%		
	GH and MS	33.3%	0.0%		
	GH and KW	50.0%	0.0%		
	EL and MS	75.0%	0.0%		
	EL and KW	33.3%	0.0%		
	MS and KW	40.0%	0.0%		
				51.2%	0.0%
0805	SB and GH	25.0%	0.0%		
	SB and EL	9.1%	0.0%		
	SB and MS	28.6%	0.0%		
	SB and KW	33.3%	0.0%		
	GH and EL	18.2%	0.0%		
	GH and MS	35.7%	0.0%		
	GH and KW	21.4%	0.0%		
	EL and MS	14.3%	0.0%		
	EL and KW	16.7%	0.0%		
	MS and KW	25.0%	0.0%		
				22.7%	0.0%
0828	SB and GH	33.3%	0.0%		
	SB and EL	23.5%	0.0%		
	SB and MS	8.3%	0.0%		
	SB and KW	35.7%	0.0%		
	GH and EL	61.5%	0.0%		
	GH and MS	30.0%	0.0%		
	GH and KW	46.2%	0.0%		
	EL and MS	27.3%	0.0%		
	EL and KW	42.9%	0.0%		
	MS and KW	33.3%	0.0%		
				34.2%	0.0%
0854	SB and GH	75.0%	0.0%		
	SB and EL	50.0%	0.0%		
	SB and MS	25.0%	0.0%		
	SB and KW	38.5%	0.0%		
	GH and EL	45.5%	0.0%		
	GH and MS	33.3%	0.0%		
	GH and KW	35.7%	0.0%		
	EL and MS	25.0%	0.0%		
	EL and KW	44.4%	0.0%		
	MS and KW	30.0%	0.0%		
				40.2%	0.0%

PACKET IX

PERCENTAGES OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
1025	SB and GH	72.7%	0.0%		
	SB and EL	63.6%	0.0%		
	SB and MS	30.0%	0.0%		
	SB and KW	60.0%	0.0%		
	GH and EL	90.0%	0.0%		
	GH and MS	40.0%	0.0%		
	GH and KW	54.5%	0.0%		
	EL and MS	44.4%	0.0%		
	EL and KW	45.5%	0.0%		
	MS and KW	22.2%	0.0%		
				52.3%	0.0%

PACKET X
PERCENTAGE OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0043	AB and SB	55.6%	0.0%		
	AB and KC	62.5%	12.5%		
	AB and IL	22.2%	0.0%		
	AB and EL	33.3%	14.3%		
	SB and KC	57.1%	0.0%		
	SB and IL	12.5%	0.0%		
	SB and EL	42.9%	0.0%		
	KC and IL	33.3%	0.0%		
	KC and EL	28.6%	28.6%		
	IL and EL	16.7%	0.0%		
				36.5%	5.5%
0062	AB and SB	40.0%	0.0%		
	AB and KC	44.4%	0.0%		
	AB and EL	21.4%	0.0%		
	AB and IL	37.5%	0.0%		
	SB and KC	30.8%	0.0%		
	SB and EL	40.0%	0.0%		
	SB and IL	36.4%	0.0%		
	KC and EL	25.0%	0.0%		
	KC and IL	40.0%	0.0%		
	EL and IL	38.5%	0.0%		
				35.4%	0.0%
0088	AB and SB	33.3%	8.3%		
	AB and KC	33.3%	0.0%		
	AB and EL	18.8%	0.0%		
	AB and IL	26.7%	0.0%		
	SB and KC	50.0%	0.0%		
	SB and EL	35.0%	0.0%		
	SB and IL	42.1%	0.0%		
	KC and EL	35.3%	0.0%		
	KC and IL	21.1%	0.0%		
	EL and IL	30.0%	0.0%		
				32.6%	0.8%
0124	AB and SB	14.3%	0.0%		
	AB and KC	20.0%	0.0%		
	AB and EL	33.3%	0.0%		
	AB and IL	25.0%	0.0%		
	SB and KC	42.9%	0.0%		
	SB and EL	14.3%	0.0%		
	SB and IL	28.6%	0.0%		
	KC and EL	0.0%	0.0%		
	KC and IL	16.7%	0.0%		
	EL and IL	25.0%	0.0%		
				22.0%	0.0%

PACKET X
PERCENTAGE OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0155	AB and SB	50.0%	0.0%		
	AB and KC	42.9%	0.0%		
	AB and EL	66.7%	0.0%		
	AB and IL	50.0%	0.0%		
	SB and KC	71.4%	0.0%		
	SB and EL	71.4%	0.0%		
	SB and IL	75.0%	0.0%		
	KC and EL	42.9%	0.0%		
	KC and IL	50.0%	0.0%		
	EL and IL	71.4%	0.0%		
				59.2%	0.0%
0294	AB and SB	20.0%	0.0%		
	AB and KC	20.0%	0.0%		
	AB and EL	12.5%	0.0%		
	AB and IL	14.3%	0.0%		
	SB and KC	0.0%	0.0%		
	SB and EL	12.5%	0.0%		
	SB and IL	0.0%	0.0%		
	KC and EL	12.5$	0.0%		
	KC and IL	14.3%	0.0%		
	EL and IL	37.5%	0.0%		
				14.4%	0.0%
0314	AB and SB	45.5%	0.0%		
	AB and KC	28.6%	0.0%		
	AB and EL	20.0%	0.0%		
	AB and IL	55.6%	0.0%		
	SB and KC	30.0%	0.0%		
	SB and EL	45.5%	0.0%		
	SB and IL	80.0%	0.0%		
	KC and EL	28.6%	0.0%		
	KC and IL	22.2%	0.0%		
	EL and IL	55.6%	0.0%		
				41.2%	0.0%
0379	AB and SB	80.0%	0.0%		
	AB and KC	16.7%	0.0%		
	AB and EL	22.2%	0.0%		
	AB and IL	50.0%	0.0%		
	SB and KC	33.3%	0.0%		
	SB and EL	20.0%	0.0%		
	SB and IL	40.0%	0.0%		
	KC and EL	0.0%	0.0%		
	KC and IL	0.0%			
	EL and IL	28.6%	0.0%		
				29.1%	0.0%

PACKET X

PERCENTAGE OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0404	AB and SB	40.0%	0.0%		
	AB and KC	20.0%	0.0%		
	AB and EL	33.3%	0.0%		
	AB and IL	25.0%	0.0%		
	SB and KC	16.7%	0.0%		
	SB and EL	50.0%	0.0%		
	SB and IL	37.5%	0.0%		
	KC and EL	33.3%	0.0%		
	KC and IL	11.1%	0.0%		
	EL and IL	50.0%	0.0%		
				31.7%	0.0%
0426	AB and SB	30.0%	0.0%		
	AB and KC	33.3%	0.0%		
	AB and EL	25.0%	0.0%		
	AB and IL	100.0%	0.0%		
	SB and KC	25.0%	0.0%		
	SB and EL	21.4%	0.0%		
	SB and IL	30.0%	0.0%		
	KC and EL	9.1%	0.0%		
	KC and IL	33.3%	0.0%		
	EL and IL	25.0%	0.0%		
				33.2%	0.0%
0464	AB and SB	50.0%	0.0%		
	AB and KC	28.6%	0.0%		
	AB and EL	42.9%	0.0%		
	AB and IL	66.7%	0.0%		
	SB and KC	25.0%	0.0%		
	SB and EL	37.5%	0.0%		
	SB and IL	57.1%	0.0%		
	KC and EL	22.2%	0.0%		
	KC and IL	37.5%	0.0%		
	EL and IL	50.0%	20.0%		
				41.8%	2.0%
0474	AB and SB	18.2%	0.0%		
	AB and KC	40.0%	0.0%		
	AB and EL	14.3%	0.0%		
	AB and IL	50.0%	0.0%		
	SB and KC	20.0%	0.0%		
	SB and EL	30.0%	0.0%		
	SB and IL	22.2%	0.0%		
	KC and EL	16.7%	0.0%		
	KC and IL	66.7%	0.0%		
	EL and IL	20.0%	0.0%		
				29.8%	0.0%

PACKET X
PERCENTAGE OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0521	AB and SB	50.0%	12.5%		
	AB and KC	50.0%	20.0%		
	AB and EL	75.0%	16.7%		
	AB and IL	40.0%	0.0%		
	SB and KC	40.0%	16.7%		
	SB and EL	60.0%	0.0%		
	SB and IL	33.3%	0.0%		
	KC and EL	66.7%	0.0%		
	KC and IL	66.7%	0.0%		
	EL and IL	50.0%	0.0%		
				53.2%	6.6%
0567	AB and SB	36.4%	0.0%		
	AB and KC	60.0%	0.0%		
	AB and EL	57.1%	0.0%		
	AB and IL	100.0%	0.0%		
	SB and KC	36.4%	0.0%		
	SB and EL	38.5%	0.0%		
	SB and IL	36.4%	0.0%		
	KC and EL	57.1%	0.0%		
	KC and IL	60.0%	0.0%		
	EL and IL	57.1%	0.0%		
				53.9%	0.0%
0601	AB and SB	20.0%	0.0%		
	AB and KC	25.0%	0.0%		
	AB and EL	27.3%	0.0%		
	AB and IL	22.2%	0.0%		
	SB and KC	38.9%	0.0%		
	SB and EL	41.2%	0.0%		
	SB and IL	45.5%	0.0%		
	KC and EL	10.5%	0.0%		
	KC and IL	38.1%	6.8%		
	EL and IL	40.0%	4.0%		
				30.9%	1.1%
0602	AB and SB	25.0%	0.0%		
	AB and KC	25.0%	20.0%		
	AB and EL	20.0%	16.7%		
	AB and IL	33.3%	0.0%		
	SB and KC	22.2%	0.0%		
	SB and EL	9.1%	0.0%		
	SB and IL	25.0%	0.0%		
	KC and EL	40.0%	16.7%		
	KC and IL	25.0%	0.0%		
	EL and IL	20.0%	0.0%		
				24.5%	5.3%

PACKET X

PERCENTAGE OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0606	AB and SB	57.1%	10.0%		
	AB and KC	37.5%	0.0%		
	AB and EL	33.3%	0.0%		
	AB and IL	33.3%	25.0%		
	SB and KC	33.3%	0.0%		
	SB and EL	50.0%	0.0%		
	SB and IL	28.6%	11.1%		
	KC and EL	28.6%	0.0%		
	KC and IL	12.5%	0.0%		
	EL and IL	50.0%	0.0%		
				36.4%	4.6%
0704	AB and SB	50.0%	0.0%		
	AB and KC	12.5%	0.0%		
	AB and EL	20.0%	0.0%		
	AB and IL	40.0%	0.0%		
	SB and KC	30.0%	0.0%		
	SB and EL	25.0%	0.0%		
	SB and IL	37.5%	0.0%		
	KC and EL	40.0%	0.0%		
	KC and IL	33.3%	0.0%		
	EL and IL	66.7%	0.0%		
				35.5%	0.0%
0753	AB and SB	21.4%	0.0%		
	AB and KC	50.0%	0.0%		
	AB and EL	33.3%	0.0%		
	AB and IL	57.1%	0.0%		
	SB and KC	21.4%	0.0%		
	SB and EL	8.3%	0.0%		
	SB and IL	14.3%	0.0%		
	KC and EL	33.3%	0.0%		
	KC and IL	37.5%	0.0%		
	EL and IL	40.0%	0.0%		
				31.7%	0.0%
0754	AB and SB	22.2%	0.0%		
	AB and KC	12.5%	0.0%		
	AB and EL	9.1%	0.0%		
	AB and IL	10.0%	0.0%		
	SB and KC	14.3%	0.0%		
	SB and EL	37.5%	0.0%		
	SB and IL	25.0%	0.0%		
	KC and EL	50.0%	0.0%		
	KC and IL	14.3%	0.0%		
	EL and IL	37.5%	0.0%		
				23.2%	0.0%

PACKET X

PERCENTAGE OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0772	AB and SB	44.4%	0.0%		
	AB and KC	80.0%	0.0%		
	AB and EL	37.5%	0.0%		
	AB and IL	15.4%	0.0%		
	SB and KC	50.0%	0.0%		
	SB and EL	55.6%	0.0%		
	SB and IL	28.6%	0.0%		
	KC and EL	42.9%	0.0%		
	KC and IL	16.7%	0.0%		
	EL and IL	14.3%	0.0%		
				38.5%	0.0%
0782	AB and SB	27.3%	0.0%		
	AB and KC	33.3%	0.0%		
	AB and EL	36.4%	0.0%		
	AB and IL	55.6%	0.0%		
	SB and KC	55.6%	7.7%		
	SB and EL	70.0%	6.7%		
	SB and IL	60.0%	7.1%		
	KC and EL	50.0%	7.1%		
	KC and IL	55.6%	8.3%		
	EL and IL	70.0%	0.0%		
				51.4%	3.7%
0802	AB and SB	25.0%	0.0%		
	AB and KC	22.2%	0.0%		
	AB and EL	50.0%	0.0%		
	AB and IL	37.5%	0.0%		
	SB and KC	50.0%	0.0%		
	SB and EL	44.4%	0.0%		
	SB and IL	33.3%	0.0%		
	KC and EL	50.0%	0.0%		
	KC and IL	60.0%	0.0%		
	EL and IL	50.0%	0.0%		
				42.2%	0.0%
0884	AB and SB	66.7%	0.0%		
	AB and KC	57.1%	14.3%		
	AB and EL	50.0%	0.0%		
	AB and IL	40.0%	0.0%		
	SB and KC	83.3%	0.0%		
	SB and EL	50.0%	0.0%		
	SB and IL	40.0%	0.0%		
	KC and EL	42.9%	0.0%		
	KC and IL	50.0%	0.0%		
	EL and IL	44.4%	0.0%		
				52.4%	1.4%

PACKET X

PERCENTAGE OF CONSISTENCY

ARTICLE NUMBER	PAIRS OF ANALYSTS	CONCEPT CONSISTENCY	TERMINOLOGY CONSISTENCY	ARITHMETIC MEAN OF CONCEPT CONSISTENCY OF ALL PAIRS	ARITHMETIC MEAN OF TERMINOLOGY CONSISTENCY OF ALL PAIRS
0936	AB and SB	44.4%	0.0%		
	AB and KC	33.3%	0.0%		
	AB and EL	22.2%	0.0%		
	AB and IL	33.3%	0.0%		
	SB and KC	37.5%	0.0%		
	SB and EL	40.0%	0.0%		
	SB and IL	50.0%	0.0%		
	KC and EL	28.6%	0.0%		
	KC and IL	25.0%	0.0%		
	EL and IL	44.4%	22.2%		
				35.9%	2.2%

APPENDIX H

TABLES OF PERCENTILE RANGES OF SCORES FOR ALL PACKETS OF ARTICLES

PERCENTILE RANGES FOR ARTICLES IN PACKET I

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	5	0
1.0 - 10.9	0	18	0
11.0 - 20.9	0	2	1
21.0 - 30.9	4	0	8
31.0 - 40.9	12	0	10
41.0 - 50.9	6	0	4
51.0 - 60.9	2	0	1
61.0 - 70.9	1	0	1
71.0 - 80.9	0	0	0
81.0 - 90.0	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET II

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	5	0
1.0 - 10.9	0	17	0
11.0 - 20.9	0	3	2
21.0 - 30.9	5	0	8
31.0 - 40.9	12	0	7
41.0 - 50.9	6	0	7
51.0 - 60.9	2	0	0
61.0 - 70.9	1	0	1
71.0 - 80.9	1	0	0
81.0 - 90.9	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET III

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	13	0
1.0 - 10.9	0	12	0
11.0 - 20.9	1	0	2
21.0 - 30.9	7	0	7
31.0 - 40.9	11	0	11
41.0 - 50.9	4	0	3
51.0 - 60.9	0	0	0
61.0 - 70.9	1	0	1
71.0 - 80.9	0	0	0
81.0 - 90.0	1	0	1
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET IV

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	7	0
1.0 - 10.9	0	16	0
11.0 - 20.9	0	1	1
21.0 - 30.9	5	1	7
31.0 - 40.9	7	0	5
41.0 - 50.9	8	0	9
51.0 - 60.9	4	0	2
61.0 - 70.9	1	0	1
71.0 - 80.9	0	0	0
81.0 - 90.9	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET V

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BEWTEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	16	0
1.0 - 10.9	0	9	0
11.0 - 20.9	2	0	3
21.0 - 30.9	5	0	5
31.0 - 40.9	10	0	10
41.0 - 50.9	5	0	4
51.0 - 60.9	1	0	1
61.0 - 70.9	2	0	2
71.0 - 80.9	0	0	0
81.0 - 90.0	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET VI

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	11	0
1.0 - 10.9	0	12	1
11.0 - 20.9	1	2	1
21.0 - 30.9	6	0	8
31.0 - 40.9	10	0	9
41.0 - 50.9	6	0	4
51.0 - 60.9	2	0	2
61.0 - 70.9	0	0	0
71.0 - 80.9	0	0	0
81.0 - 90.9	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET VII

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BEWTEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	7	0
1.0 - 10.9	0	16	0
11.0 - 20.9	2	2	2
21.0 - 30.9	4	0	10
31.0 - 40.9	7	0	6
41.0 - 50.9	9	0	4
51.0 - 60.9	2	0	2
61.0 - 70.9	1	0	1
71.0 - 80.9	0	0	0
81.0 - 90.0	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET VIII

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	5	0
1.0 - 10.9	0	18	0
11.0 - 20.9	4	2	6
21.0 - 30.9	9	0	9
31.0 - 40.9	7	0	6
41.0 - 50.9	4	0	3
51.0 - 60.9	0	0	0
61.0 - 70.9	0	0	0
71.0 - 80.9	1	0	1
81.0 - 90.9	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET IX

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	14	0
1.0 - 10.9	0	10	0
11.0 - 20.9	1	1	3
21.0 - 30.9	11	0	13
31.0 - 40.9	8	0	4
41.0 - 50.9	2	0	2
51.0 - 60.9	3	0	3
61.0 - 70.9	0	0	0
71.0 - 80.9	0	0	0
81.0 - 90.0	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET X

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	17	0
1.0 - 10.9	0	8	0
11.0 - 20.9	1	0	2
21.0 - 30.9	6	0	5
31.0 - 40.9	10	0	11
41.0 - 50.9	3	0	3
51.0 - 60.9	5	0	4
61.0 - 70.9	0	0	0
71.0 - 80.9	0	0	0
81.0 - 90.9	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET XI

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	10	0
1.0 - 10.9	0	15	0
11.0 - 20.9	2	0	3
21.0 - 30.9	7	0	8
31.0 - 40.9	9	0	8
41.0 - 50.9	6	0	5
51.0 - 60.9	1	0	1
61.0 - 70.9	0	0	0
71.0 - 80.9	0	0	0
81.0 - 90.0	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET XII

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	14	0
1.0 - 10.9	1	10	1
11.0 - 20.9	2	1	3
21.0 - 30.9	5	0	7
31.0 - 40.9	9	0	7
41.0 - 50.9	4	0	4
51.0 - 60.9	3	0	2
61.0 - 70.9	1	0	1
71.0 - 80.9	0	0	0
81.0 - 90.9	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET XIII

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	2	0
1.0 - 10.9	0	19	0
11.0 - 20.9	0	4	0
21.0 - 30.9	3	0	8
31.0 - 40.9	7	0	8
41.0 - 50.9	8	0	6
51.0 - 60.9	7	0	3
61.0 - 70.9	0	0	0
71.0 - 80.9	0	0	0
81.0 - 90.0	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET XIV

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	7	0
1.0 - 10.9	0	15	0
11.0 - 20.9	1	3	3
21.0 - 30.9	4	0	4
31.0 - 40.9	7	0	8
41.0 - 50.9	10	0	8
51.0 - 60.9	2	0	2
61.0 - 70.9	0	0	0
71.0 - 80.9	1	0	0
81.0 - 90.9	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET XV

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	8	0
1.0 - 10.9	0	16	0
11.0 - 20.9	0	1	0
21.0 - 30.9	1	0	2
31.0 - 40.9	3	0	7
41.0 - 50.9	12	0	9
51.0 - 60.9	8	0	7
61.0 - 70.9	1	0	0
71.0 - 80.9	0	0	0
81.0 - 90.0	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET XVI

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	13	0
1.0 - 10.9	0	11	0
11.0 - 20.9	1	1	1
21.0 - 30.9	2	0	2
31.0 - 40.9	8	0	10
41.0 - 50.9	9	0	9
51.0 - 60.9	3	0	2
61.0 - 70.9	1	0	1
71.0 - 80.9	1	0	0
81.0 - 90.9	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET XVII

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	6	0
1.0 - 10.9	0	18	0
11.0 - 20.9	0	0	0
21.0 - 30.9	5	1	8
31.0 - 40.9	8	0	10
41.0 - 50.9	7	0	4
51.0 - 60.9	3	0	1
61.0 - 70.9	2	0	2
71.0 - 80.9	0	0	0
81.0 - 90.0	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET XVIII

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	8	0
1.0 - 10.9	0	16	0
11.0 - 20.9	2	1	3
21.0 - 30.9	5	0	9
31.0 - 40.9	11	0	9
41.0 - 50.9	5	0	4
51.0 - 60.9	2	0	0
61.0 - 70.9	0	0	0
71.0 - 80.9	0	0	0
81.0 - 90.9	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET XIX

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	7	0
1.0 - 10.9	0	14	0
11.0 - 20.9	0	4	3
21.0 - 30.9	3	0	4
31.0 - 40.9	12	0	12
41.0 - 50.9	5	0	2
51.0 - 60.9	5	0	4
61.0 - 70.9	0	0	0
71.0 - 80.9	0	0	0
81.0 - 90.0	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET XX

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	8	0
1.0 - 10.9	0	14	1
11.0 - 20.9	3	3	3
21.0 - 30.9	4	0	5
31.0 - 40.9	10	0	10
41.0 - 50.9	6	0	4
51.0 - 60.9	2	0	2
61.0 - 70.9	0	0	0
71.0 - 80.9	0	0	0
81.0 - 90.9	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET XXI

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	11	0
1.0 - 10.9	0	12	1
11.0 - 20.9	0	0	1
21.0 - 30.9	6	2	7
31.0 - 40.9	10	0	7
41.0 - 50.9	5	0	6
51.0 - 60.9	4	0	3
61.0 - 70.9	0	0	0
71.0 - 80.9	0	0	0
81.0 - 90.0	0	0	0
91.0 - 100	0	0	0

PERCENTILE RANGES FOR ARTICLES IN PACKET XXII

PERCENTILE	MEAN CONCEPT CONSISTENCY	MEAN TERMINOLOGY CONSISTENCY	DIFFERENCE BETWEEN MEAN CONCEPT CONSISTENCY AND MEAN TERMINOLOGY CONSISTENCY
0.0 - 0.9	0	6	0
1.0 - 10.9	0	16	1
11.0 - 20.9	1	3	2
21.0 - 30.9	6	0	8
31.0 - 40.9	10	0	8
41.0 - 50.9	6	0	5
51.0 - 60.9	1	0	0
61.0 - 70.9	1	0	1
71.0 - 80.9	0	0	0
81.0 - 90.9	0	0	0
91.0 - 100	0	0	0

APPENDIX I
GLOSSARY

APPENDIX I
GLOSSARY

Concept: A generalized idea of a class of objects; a general idea or understanding especially one derived from specific instances or occurrences.

Fuzzy set: A set in which there are continuums of grades of memberships.

Set: A collection of distinct elements; a collection of particular things; a collection of things that share common characteristics.

Verbal: Of, pertaining to, or associated with words; in this study, this word is not used in the sense of the spoken word, the word "oral" is used for spoken words.

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